Intelect TRANSPORT®

Vectra GENISYS®

Ultrasound Therapy Systems

SERVICE MANUAL

Moving Rehabilitation Forward™

System Models:
2782 - Serial numbers 1000 and above
2759 - Serial numbers 1000 and above

CHATTANOOGA GROUP

ISO 13485 CERTIFIED

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Read, understand, and follow the safety precautions and all other information contained in this manual.

This manual contains the necessary safety and field service information for those field service technicians, certified by Chattanooga Group, to perform field service on Intelect Transport/Vectra Genisys Ultrasound Therapy Systems. At the time of publication, the information contained herein was current and up-to-date. However, due to continual technological improvements and increased clinical knowledge in the field of ultrasound therapy, as well as Chattanooga Groups policy of continual improvement, Chattanooga Group reserves the right to make periodic changes and improvements to their equipment and documentation without any obligation on the part of Chattanooga Group. As significant changes occur to Intelect Transport/Vectra Genisys Ultrasound Therapy Systems, service bulletins will be made available on our website (chattgroup.com) in lieu of reprinted manuals.

Technicians repairing Intelect Transport/Vectra Genisys Ultrasound Therapy Systems agree to assume all risk and liability associated with this process.

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1.1 PRECAUTIONARY SYMBOL DEFINITIONS

The precautionary instructions found in this manual are indicated by specific symbols. Understand these symbols and their definitions before operating or servicing this equipment. The definitions of these symbols are as follows:

⚠ CAUTION

A. CAUTION

Text with a "CAUTION" indicator will explain possible safety infractions that have the potential to cause minor to moderate injury or damage to equipment.

⚠ WARNING

B. WARNING

Text with a "WARNING" indicator will explain possible safety infractions that will potentially cause serious injury and equipment damage.

⚠ DANGER

C. DANGER

Text with a "DANGER" indicator will explain possible safety infractions that are imminently hazardous situations that would result in death or serious injury.

D. EXPLOSION HAZARD

Do not use this equipment in the presence of flammable anesthetics. This symbol is also prominently displayed on the serial number plate of the unit.

E. DANGEROUS VOLTAGE

Text with a "Dangerous Voltage" indicator serves to inform the Service Technician of possible hazards resulting in the electrical charge retained by faulty power supplies.

F. CORROSIVE HAZARD (NiMH Battery)

Text with a "Corrosive Hazard" indicator will explain possible safety infractions if the chemical components of this product are exposed to air, skin or other materials.

NOTE:

Throughout this manual "NOTE" may be found. The Notes are helpful information to aid in the particular area or function being described.

1.2 PRECAUTIONARY INSTRUCTIONS

Read, understand, and follow all safety precautions found in this manual. Below are general safety precautions that must be read and understood before attempting any service techniques on these systems.

⚠ CAUTION

- Read, understand and practice the precautionary and operating instructions. Know the limitations and hazards associated with using any ultrasound device. Observe the precautionary and operational decals placed on the unit.
- Do not operate the unit in an environment of short-wave diathermy use.
- The Ultrasound modality should be routinely checked to determine that all controls function normally using the information provided within this manual.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to ultrasonic energy.
- Do Not use sharp objects such as a pencil point or ballpoint pen to operate the buttons on the control panel as damage may result.
- Operate, transport and store this unit in temperatures between 59 °F and 104 °F (15 °C and 40 °C), with Relative Humidity ranging from 30%-60%.
- Inappropriate handling of, and subjecting the ultrasound applicator to physical abuse, may adversely affect its characteristics.
- Inspect Applicator for cracks, which may allow the ingress of conductive fluid before each use.
- Inspect all cables, and associated connectors before each use.

1.2 SAFETY PRECAUTIONS (CONTINUED)

⚠ WARNING

- Do not apply the Ultrasound Applicator to the patient during the Head Warming period. Applicator must remain in Applicator Hook during the Head Warming period.
- Use only degassed water in power meter for testing Ultrasound Applicators. Use of other types of water will cause false test results. see **page 12** for degassed water recipes.
- Use of other brands or types of tools, equipment, fixtures, materials, and supplies other than those specifically listed on **page 12** will give bad test and calibration results.
- If proper equipment is not available or cannot be obtained, send the Ultrasound Applicators to the factory for calibration.
- Do not aerate water when filling power meter.
- Unplug the unit from the power source and/or remove Battery before attempting any removal or replacement procedures to prevent electrical shock.
- Dielectric Withstand Test must always be performed after a Power Supply has been replaced. Field technicians unequipped to preform the Dielectric Withstand Test should contact the manufacturer for Power Supply replacement.

⚠ DANGER

- Handle Power Supply shield with caution. Penetration of the shield may result in damage to the unit and/or personal injury.
- The Power Supply will retain high voltage in the Power Supply Capacitor C4. Discharge Capacitor using a multimeter prior to any service of the Power Supply
- Applicator must be calibrated after removal and replacement of any part, using an Ohmic UPM DT 10 or UPM DT 100. Failure to calibrate a repaired Applicator, using the proper equipment, may result in serious injury or harm to the patient.

2- THEORY OF OPERATION

2.1 OVERVIEW

The Intelect Transport/Vectra Genisys Ultrasound Therapy Systems are comprised of several PC board assemblies housed within a common enclosure. These assemblies each support a distinct function in the product. The basic elements are User Interface, Control Board, Ultrasound Board, Ultrasound Applicator, and Power Supply.

2.2 POWER SUPPLY

A universal input Power Supply provides all parts of the system with 24 VDC. The supply is connected to the mains at all times when the cord is attached. The power switch on the top of the unit, switches the 24 VDC output of the Power Supply to the different components in the system. The 24 VDC supply is regulated locally at each PC Board as required.

2.3 CONTROL BOARD

The Control Board serves just as its name implies. It controls the operation of the Ultrasound Board, User Interface and optional accessories. The Control Board communicates to the Ultrasound Board. The Control Board drives the Display. The Control Board reads the menu buttons. The Control Board also reads the amplitude and the Contrast Control on the system. Sound output is generated by the Control Board and routed to an internal speaker.

2.4 ULTRASOUND BOARD AND APPLICATOR

The Ultrasound Board generates the 1 or 3.3 MHz output to drive the ultrasound Sound Head. The Ultrasound Board is accessed much like an I/O port by the Control Board. It can provide current and voltage information about the ultrasound output of the board. The calibration data for the Sound Head is passed through the Ultrasound Board from the Applicator up to the Control Board. By storing the calibration data in the Applicator there is no calibration necessary for the Ultrasound Board. Calibrated Chattanooga Group Ultrasound Applicators, designed for the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems, can be connected and operated on any Intelect Transport/Vectra Genisys Therapy System to provide accurate coupling and output.

2.5 USER INTERFACE AND ACCESSORIES

The LCD display panel provides the operator visible feedback in the way of menu choices. Pressing the menu buttons makes selections from the menus. The Control Board interprets these user inputs and responds accordingly. Audible feedback is given as well for events such as key presses and end of treatment.

The Optional Battery mounts in the system bottom and supplies 24 VDC to the power supply. The Power Supply distributes the power required to the system as needed. The charging circuit for the battery is incorporated on the Control Board. An icon on the display reflects the available amount of charge in the battery. When the system is connected to an approved power outlet and a Battery is installed in the system, the system will charge the Battery to full capacity. The incorporated charger will not overcharge the Battery.

3.1 INTELECT TRANSPORT/VECTRA GENISYS ULTRASOUND THERAPY SYSTEMS

The nomenclature graphics below, Figure 3.1, indicates the general locations of the exterior components of the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems.
Know the components and their functions before performing any operation on or service to the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems.

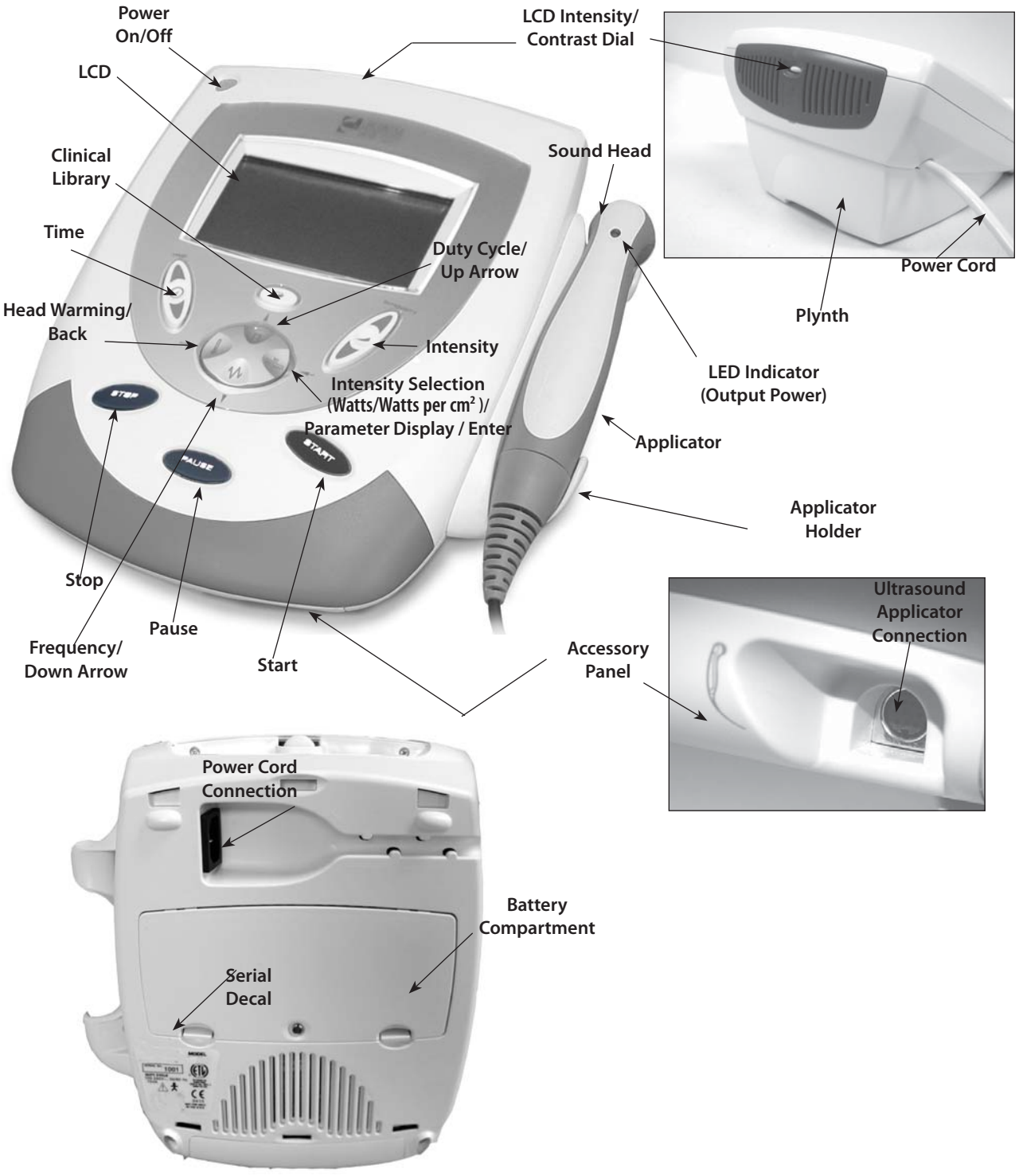


FIGURE 3.1

3.2 HARDWARE AND SOFTWARE SYMBOL DEFINITIONS

The symbols below are found on the system as well as within the software. These symbols are defined for the purpose of recognition and functionality when operating or performing service on the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems.
Know the symbols and their definitions before performing any operation of or service to the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems.

Intelect Transport/Vectra Genisys Ultrasound Therapy Systems Hardware Symbols

Power On/Off
The Power On/Off button controls the flow of electricity to the unit. Illuminates steady when system is On. Flashes when power is available.

LCD
The LCD (Liquid Crystal Display) allows the user to view and monitor the information displayed before, during, and after therapy.

Clinical Library
Select this button to access the following functions:
- Retrieve User Protocol
- Restore Factory Settings
- Restore Factory Protocols
- Languages
- View Unit Information

Time
Press the Up or Down arrow buttons to set total treatment time of therapy.

Back
Use this button to return to the previous window.

STOP
Select this button to stop a treatment session.

Down Arrow
When the window displays a list of options, press the Down Arrow button to scroll down the list.

Pause
Press this button to pause and restart therapy sessions.

Sound Head
The aluminum face of the applicator that contacts the patient's skin. It covers a transducer mechanism that converts electrical energy to mechanical energy in the form of a vibrating crystal.

LED Indicator (Output Power)
When illuminated, this green light signifies that ultrasound energy is being emitted from the Sound Head.

Applicator
The hand held assembly used to deliver ultrasonic energy. The Applicator includes the Sound Head, Transducer, and related electronics.

3.2 HARDWARE AND SOFTWARE SYMBOL DEFINITIONS (CONTINUED)

Ultrasound Applicator Connection
This port serves as the connection point between the unit and the Ultrasound Applicator.

START
Select Start to begin a treatment session.

Accept and Return
Select to accept menu selection and to return to the home screen

INTENSITY
Use the up or down arrow on the Intensity button to adjust Ultrasound Intensity to the prescribed level.

Duty Cycle
Press to select and display the Duty Cycle of the Ultrasound as prescribed. Options available are: 10%, 20%, 50,% or Continuous (100%).

Up Arrow
When the window displays a list of options, press the Up Arrow button to scroll up the list.

Battery Indicator
When displayed on the LCD, this symbol indicates the Battery pack option is present on the unit. This symbol also displays the charge status of the Battery.

LCD Intensity/Contrast Dial
If the intensity of the LCD display diminishes, turn the dial until the Display contrast is optimal.

Charge Indicator
This symbol displays when the unit is connected to Mains Power and the Battery Pack is charging.

Frequency
Press to change Frequency to 3 MHz or 1 MHz.

Intensity Display
Press to display "Watts" or "Watts per cm^2" for the output of the ultrasound.

Head Warming
Press to turn Off or On the Head Warming feature of the system.

Increase
Found in two locations on the system, press to increase session time and/or ultrasound intensity respectively.

Decrease
Found in two locations on the system, press to decrease session time and/or ultrasound intensity respectively.

NOTE: During Battery operation, if the unit is left on, but is not active for more than five minutes, it will power off to conserve Battery power. To restore power, press the Power On/Off button.

4.1 INTELECT TRANSPORT/VECTRA GENISYS ULTRASOUND THERAPY SYSTEMS

Figure 4.1 below provides physical details of the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems. This section also provides ultrasound specifications to aid in troubleshooting.

Refer to this section when performing troubleshooting, replacement, and repair of the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems.

A. Intelect Transport/Vectra Genisys Ultrasound Therapy Systems Physical Specifications

FIGURE 4.1

Dimensions

Width ..... 28.8 cm (11.3")
Height ..... 16.3 cm (6.4")
Depth ..... 32.8 cm (12.9")

Weight

Standard Weight (with base) ..... 2.3 kg (5.07 lb)
Battery Pack ..... 0.85 kg (1.87 lb)

Power

Input ..... 100 - 240 VAC, 50/60 Hz 75 VA
Output ..... +24 V, 1.0 A
Electrical Class ..... CLASS I

Electrical Type

Ultrasound TYPE B .....

Battery Type ..... Nickel Metal Hydride (NiMH) (1.2 V x 20 size AA)

Operating Environment

Temperature ..... Between 59° F and 104° F (15° C and 40° C)
Relative Humidity 30%-60%
Atmospheric Pressure ..... 950-1,050 h Pa

Complies with:

9700675

Listed by Intertek Testing Services NA Inc.
Conforms to UL Standard 60601-1
Certified to CAN/CSA Standard C22.2 No. 601.1-M90 w/A2

Compliant to IEC/EN 60601-1, IEC 60601-1-2, 60601-2-5

4.2 INTELECT TRANSPORT/VECTRA GENISYS ULTRASOUND THERAPY SYSTEMS ULTRASOUND SPECIFICATIONS

This section provides the necessary ultrasound specifications to aid in troubleshooting.
Refer to these specifications as necessary when troubleshooting the ultrasound PC Board and Applicators.

A. Ultrasound

Frequency ..... 1 MHz, ± 5%; 3.3 MHz, ± 5%

Duty Cycles ... 10%, 20%, 50%, and Continuous

Pulse Frequency. . . . . .100 Hz

Pulse Duration ..1 mSec, ± 20%; 2 mSec, ± 20%
5 mSec, ± 20%

Output Power
10 cm^2 Crystal ..... 0-20 Watts at 1 MHz,
0-10 Watts at 3.3 MHz
5 cm^2 Crystal. . . . . 0-10 Watts, 1 and 3.3 MHz
2 cm^2 Crystal. . . . . .0-4 Watts, 1 and 3.3 MHz
1 cm^2 Crystal. . . . . .0-2 Watts, 3.3 MHz Only

Amplitude . 0 - 2.5 w/cm^2 in Continuous mode,
0-3 w/cm^2 in Duty Cycle modes

Output accuracy . . . . . .± 20% above 10% of maximum

Temporal Peak to Average Ratios:
2:1, ± 20%, at 50% Duty Cycle
5:1, ± 20%, at 20% Duty Cycle
9:1, ± 20%, at 10% Duty Cycle

Beam Non uniformity Ratio. . . .. 5.0 : 1 maximum

Beam Type . . . . . .Collimating

Effective Radiating Areas
10 cm^2 Crystal - 6.8 cm^2 - 10.0 cm^2
5 cm^2 Crystal - 3.5 cm^2 - 5.0 cm^2
2 cm^2 Crystal - 1.4 cm^2 - 2.0 cm^2
1 cm^2 Crystal - 0.7 cm^2 - 1.0 cm^2

Treatment Time . . . . . 1-30 Minutes

B. Head Warming Feature Specifications

The Head Warming feature of an Intelect Transport/Vectra Genisys Ultrasound Therapy System utilizes Ultrasound output resulting in warming of the Applicator to increase patient comfort.

With Head Warming enabled, ultrasound is emitted without pressing the Start button. The Applicator LED will not illuminate during the Head Warming period. Display will indicate "Warming".

Output . . . . 0 - 50% Cycling of maximum power

Frequency. . . . . .3.3 MHz

Sound Head Temperature ..... 85 °F - 110 °F
(29.4 °C - 43.3 °C)

⚠ WARNING

Do not apply the Ultrasound Applicator to the patient during the Head Warming period. Applicator must remain in applicator hook during the Head Warming period.

5.1 INTELECT TRANSPORT/VECTRA GENISYS ULTRASOUND THERAPY SYSTEMS ERROR MESSAGES

A. The following information is provided as an aid in defining the Software Error Messages of the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems. Once a particular error message is defined, the information will also list probable causes and possible remedies. Once the problem area is determined, subsequent tests for verification will be necessary to determine a "Bad Board".
All Troubleshooting and tests will be to validate a "Bad Board" only.
No component level troubleshooting information is or will be provided by Chattanooga Group for field troubleshooting of board components.

B. Once a particular PC board has been determined as bad, refer to the appropriate removal and replacement section for the board affected and follow the instructions for replacement of the board.

ERROR CODE	ERROR TYPE	DEFINITION	PROBABLE CAUSES	POSSIBLE REMEDY
USER CORRECTABLE WARNING MESSAGES				
	Icon	Sound Head over temp	Sound Head has overheated to a temperature that could cause damage to the crystal	1. Turn Off Head Warming feature 2. Allow Sound Head to cool before continuing therapy 3. Connect a known good Applicator to the system and try again. If system works properly, re–calibrate Applicator or replace with new Applicator. 4. Replace Applicator PC Board
	Icon	No Applicator plugged into system	Applicator not plugged into system connector Applicator connector not completely seated in system connector Applicator Cable disconnected from Applicator PCB Applicator Cable damaged Applicator not calibrated Bad Ultrasound Board	Plug Applicator into system Make certain Applicator connector is completely seated in system connector Connect Applicator Cable to Applicator PCB Replace with new Applicator Cable Replace Applicator PC Board Calibrate Applicator Replace Ultrasound Board
	Icon	Battery plugged into system but not recognized by the unit	Bad Battery Control Board damaged	Replace the Battery Replace the Control Board
100 101	WARN_US_ UNPLUGGED WARN_US_ APPL_ BECAME_ UNPLUGGED	Technician attempted to calibrate an Ultrasound Applicator but none is plugged into system Applicator came unplugged from system while administering therapy	Applicator not plugged into system connector Applicator connector not completely seated in system connector Applicator Cable disconnected from Applicator PCB Applicator Cable damaged	1. Plug Applicator into system 2. Make certain Applicator connector is completely seated in system connector 3. Connect Applicator Cable to Applicator PCB 4. Replace with new Applicator Cable 5. Replace Applicator PC Board
200	ERR_EEPROM	Error accessing the internal EEPROM used to store system configuration settings and protocols	Bad Control Board	Replace Control Board
201 202 203	ERR_APPL_ SAVE_CAL_ DATA ERR_APPL_NOT_ CAL'D_OK ERR_APPL_ SAVE_TIMEOUT	Error attempting to save data to applicator EEPROM during Applicator calibration General error attempting to calibrate an Applicator Error attempting to save data to Applicator EEPROM during Applicator calibration	Bad Applicator Bad Applicator Cable Applicator PCB Connector Bad Bad Ultrasound Board	1. Replace with new Applicator Cable 2. Replace Applicator PC Board 3. Replace with known good Applicator 4. Replace Ultrasound Board

5.1 INTELECT TRANSPORT/VECTRA GENISYS ULTRASOUND THERAPY SYSTEMS ERROR MESSAGES (CONTINUED)

ERROR CODE	ERROR TYPE	DEFINITION	PROBABLE CAUSES	POSSIBLE REMEDY
USER CORRECTABLE WARNING MESSAGES				
300	CRIT_ERR_US_BOARD	Some type of critical Ultrasound Board error has occurred	Ultrasound Board to Control Board Connecting Header loose or disconnected	1. Reseat Connecting Header into Control Board 2. Replace Ultrasound Board
301	CRIT_ERR_US_BOARD NOT_DETECTED	No Ultrasound Board is detected in unit	Bad Ultrasound Board Bad Control Board	3. Replace Control Board
302	CRIT_ERR_US_RESET	Ultrasound Board has reset for some unknown reason		
303	CRIT_ERR_US_BOARD_ READ	Error reading from Ultrasound Board		
304	CRIT_ERR_US_BOARD_ WRITE	Error writing to Ultrasound Board		
305	CRIT_ERR_US_BOARD_ CALIBRATION_ERROR	Error calibrating Applicator		
NONE	———	No indication of problem and no ultrasound output from the Applicator	Probe Spring Holder cracked or broken	Replace Probe Spring Holder
NONE	———	Interrupted ultrasound output from Applicator	Bad Applicator Cable	Replace Applicator Cable

5.2 INTELECT TRANSPORT/VECTRA GENISYS ULTRASOUND THERAPY SYSTEMS DIAGNOSTICS

A. General

1. The following information is intended to aid in troubleshooting the major components of the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems to "Board Level" only. These tests are FACTORY standard testing procedures and methods used at the factory before shipment of any Intelect Transport/Vectra Genisys Ultrasound Therapy Systems.
2. Due to the complex nature of the technology utilized by Chattanooga Group, the recommended troubleshooting techniques are to determine "Bad Board" and board replacement only. No board component level troubleshooting is recommended nor will information or parts be supplied by Chattanooga Group. Any board component level troubleshooting performed will be at sole risk and liability of the Service Technician performing such troubleshooting techniques.

B. Special Tools, Fixtures & Materials Required

1. Certain tests require the use of special tools and/or fixtures. These will be listed at the particular test where they are required. Testing with any other special tool or fixture other than those stated could give erroneous readings or test results. Always perform the tests exactly as stated to ensure accurate results.
2. Scope and other standard test equipment settings will be listed for each test performed to aid in performing the test to FACTORY standards and ensure proper readings.
3. The troubleshooting and repair of the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems should be performed only by authorized technicians trained and certified by Chattanooga Group.

C. Equipment Required

- Digital Multimeter
- Milliohm Meter
- Applicators
- Dielectric Withstand (Hi-Pot) and ground resistance tester
- Orange Stick

NOTE:

Adjust Dielectric Withstand tester to indicate fault with 120k Ohm Load across the output when at specified test voltage.

- # 1 Phillips Screwdriver
- # 2 Phillips Screwdriver
- Insulated Needle Nose Pliers
- 10k Resistor
- Ohmic Instruments UPM DT 10 or UPM DT 100 Ultrasound Power Meter
- Degassed Water (< 5 ppm) for Ultrasound Power Meter

Recipe(s) for Degassed Water

1) Boil distilled water for 30 minutes. Place water in a canning jar, and cover. Allow to cool to room temperature of approximately 70 °F (21 °C). May be refrigerated to aid cooling time.

or

2) Bring distilled water to a boil. Place the container under vacuum for 5 to 10 minutes. Use a Dissolved Oxygen Test Kit to test oxygen level of degassed water.

NOTE:
Canning jars are ideal storage and transport containers for degassed water. In order to minimize aeration of degassed water during transport fill to a positive meniscus and slide the lid over the surface. Seal tightly.

When pouring degassed water into and out of containers pour slowly down the side of the container to minimize aeration.
Do not use tap water or distilled water in the ultrasound power meter. Use only degassed water in order to obtain correct test results.
The chart below illustrates the oxygen content of degassed, tap, and distilled Water.

WATER TYPE	ppm of Oxygen
Degassed (per recipe 1 or 2)	Less than 5 ppm
Tap Water	Up to 35 ppm
Distilled Water	Up to 20 ppm

D. Full Functional Tests

Perform the tests found in this section to verify full functionality of new Intelect Transport/ Vectra Genisys Ultrasound Therapy Systems and accessories.

5.3 ELECTRICAL SAFETY

The Intelect Transport/Vectra Genisys Ultrasound Therapy Systems has been tested to IEC/EN 60601-1, Standard for Safety for Medical Equipment.

NOTE:
This device complies with current leakage, ground continuity, and dielectric withstand (Hi-Pot) limits as prescribed by IEC/EN/UL 60601-1 and CSA/CAN 601.1 Medical Electrical, Part 1: General Requirements for Safety.

Facility, local and national limits and test methods may vary.

Power Requirements
Models: 2782 and 2759 . . . . . Input : 100-240VAC
(Serial numbers 1000 and above) 75 VA, 50/60 Hz

5.4 LEAKAGE

Conduct all necessary leakage tests as required per NFPA 99 (National Fire Protection Association) "Health Care Facility" standards.

⚠ WARNING

Unit failing Dielectric Withstand or Leakage tests could indicate serious internal problems.
Do not place unit back into service! Send unit to factory for repair. Do not attempt to repair.

9700675

Listed by Intertek Testing Services NA Inc.
Conforms to UL Standard 60601-1
Certified to CAN/CSA Standard C22.2 No. 601.1-M90 w/A2

Compliant to IEC/EN 60601-1, IEC 60601-1-2, 60601-2-5

5.5 VISUAL INSPECTION

Visually inspect the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems. A visual inspection can, to an experienced technician, indicate possible abuse of the unit and internal problems.

5.6 UNIT STARTUP AND FAN TESTING

A. Test

1. Place unit face up on work surface.
2. Connect Power Cord to unit and plug into proper power receptacle.
3. Connect an Applicator to the unit.
4. Turn system on. Adjust the Intensity up and press Start. The fan will begin to run, after the audible beep tones.
5. Place hand at the back of system, near Contrast Control, to verify Fan is blowing out. **Refer to Figure 5.1.**

B. Test Results

1. Unit will not start, unit failed test.
   a) Possible bad Main Power Switch.
   b) Possible bad Power Supply.
   c) Possible bad power outlet or Mains Power Cord.
   d) Possible bad Ultrasound Board.
2. Treatment will not start up.
   a) Applicator not connected.
   b) Possible bad Ultrasound Board.
   c) Possible bad Control Board.
3. Screen does not display, unit failed test.
   a) Contrast Control needs adjusting.
   b) Possible bad Display.
   c) Possible bad Control Board.
   d) Possible bad Power Supply.
   e) Visually check power LED. If flashing, the Power Supply is good. Replace the Control Board.
   f) If not flashing perform the Ultrasound Board test to check the Ultrasound Board. **Refer to section 5.7 page 15.** If the Power Supply functions replace the Ultrasound Board.
4. Fan not blowing outward, unit failed test
   a) Fan blowing inward.
   Fan wired wrong. Rewire or replace Fan.
5. Fan not blowing.

NOTE:
The Fan only functions when Ultrasound is being emitted from the Sound Head.

a) Possible bad Fan.

b) Possible bad Power Supply.

c) Possible bad Control Board.

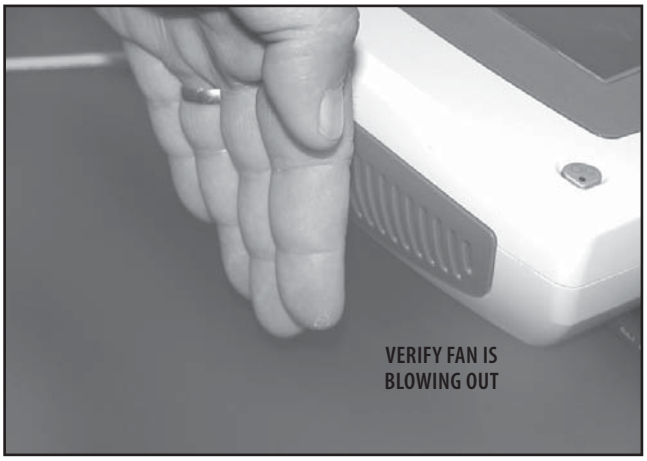


FIGURE 5.1

5.7 ULTRASOUND BOARD TEST

NOTE:

This test is designed to eliminate or verify a problem with the Ultrasound Board.

A. Test

1. Separate top from bottom. **Refer to 6.1, part C**.
2. Disconnect the Power Supply Harness from the Control Board. Lay the unit open. **Refer to Figure 5.2.**
3. Remove the Ultrasound Board. **Refer to 6.4, steps 2 and 3**.

   NOTE:

   The Ultrasound/Control Board Header may stay attached to either the Ultrasound Board or the Control Board. It may be necessary to remove the Header for installation.
4. Place the top of the unit back on the bottom of the unit. While holding the top and bottom together, with the Ultrasound Board missing, plug the unit back into the Mains Power.
5. Press the power button to verify that the unit turns on.

   NOTE:
   The Power On/Off button will flash when plugged into Mains Power if the Ultrasound Board is not functioning properly.

B. Test Results

1. Unit will power up, unit passed test.
   a) Replace the Ultrasound Board.
2. Screen does not display, unit failed test.
   a) Contrast Control needs adjusting.
   b) Possible bad Display.
   c) Possible bad Control Board.
   d) Possible bad Power Supply.

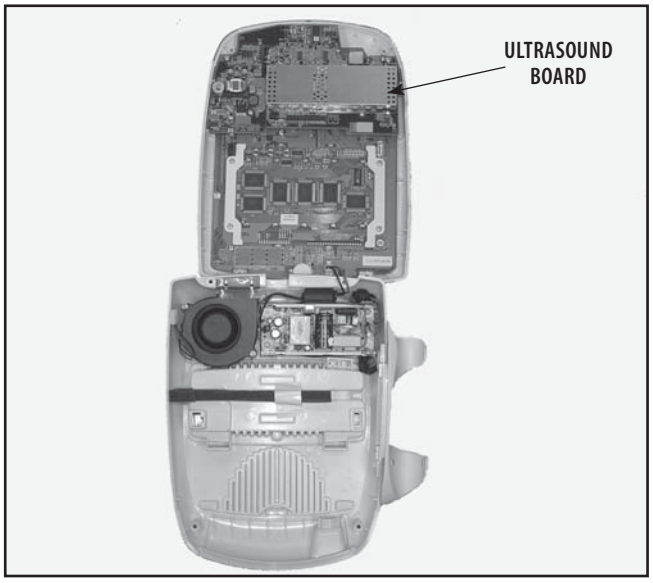


FIGURE 5.2

5.8 POWER SUPPLY TEST

A. Test

1. Separate top from bottom. **Refer to 6.1, part C**.
2. Disconnect the Power Supply Harness from the Control Board. Lay the unit open.
3. Using a multimeter, hold the red wire of the multimeter to the prong on the connector for the red wire of the Power Supply Harness. Hold the black wire of the multimeter to the prong on the connector for the black wire of the Power Supply Harness. **Refer to Figure 5.3.**

B. Test Results

1. Power Supply reads approximately 24 VDC, Power Supply is good.
2. Power Supply does not reads approximately 24 VDC, Power Supply failed test.

   a) Replace Power Supply.

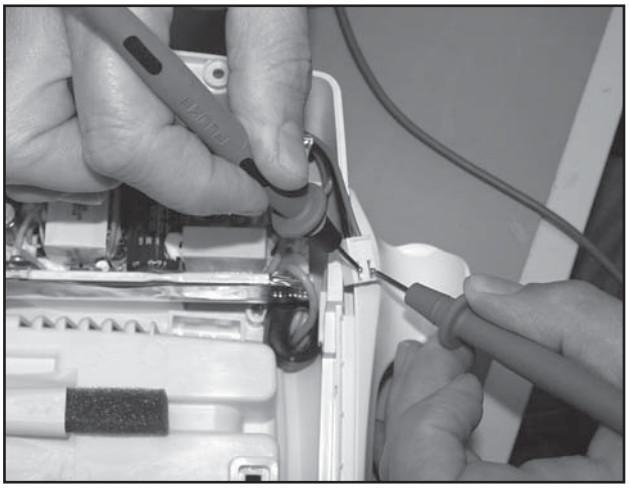


FIGURE 5.3

5.9 ULTRASOUND TESTS

A. Equipment Required for 5.9 and 5.10

- Degassed Water. **Refer to page 12** for degassed water recipes
- Ohmic Instruments UPM DT 10 or UPM DT 100 Ultrasound Power Meter
- Known good Ultrasound Applicator

NOTE:
Use any Ultrasound Applicator supplied with a Chattanooga Group unit for this test.

B. Ultrasound Applicator Identification Test Procedures

1. Without Ultrasound Applicator installed, turn unit on.
2. Look at the Display center. The Applicator not detected icon should appear. **Refer to Figure 5.4**.
3. Connect the Applicator into Applicator Receptacle. **Refer to Figure 5.5.** Watch Applicator LED while connecting to system. The LED should flash green five times.

   NOTE:

   The flashing green light indicates that the Applicator is programmed and calibrated.
4. Look at the display center. The Applicator detected icon should appear. **Refer to Figure 5.6**.

C. Ultrasound Applicator Identification Test Results

1. Unit operates as described in steps 2 and 4.
   a) Unit passed test.
2. "NO CAL" icon displays center of system Display.
   a) Applicator not calibrated.
   b) Possible bad Applicator Cable. Re-test with known good Applicator.
   c) Possible bad Ultrasound Board.
3. Not detected icon displayed after ten seconds of Applicator being plugged in.
   a) Possible bad Applicator or Applicator Cable. Re-test with known good Applicator.
   b) Possible bad Ultrasound Board.

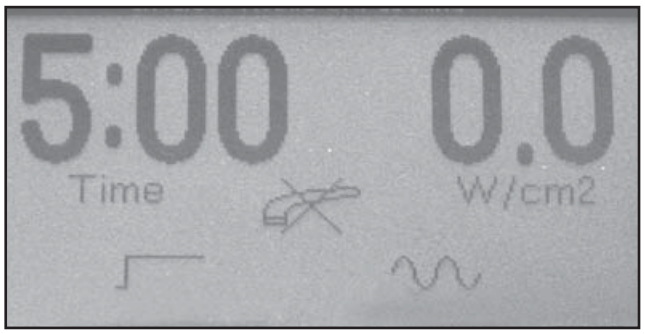


FIGURE 5.4

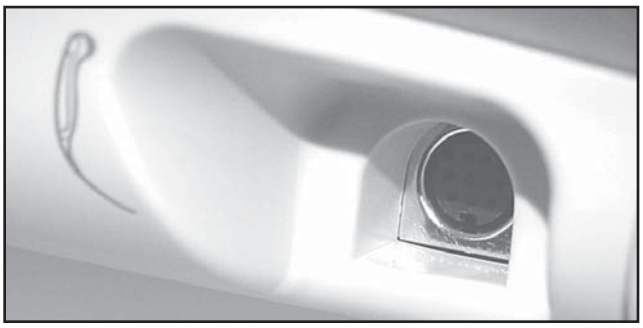


FIGURE 5.5

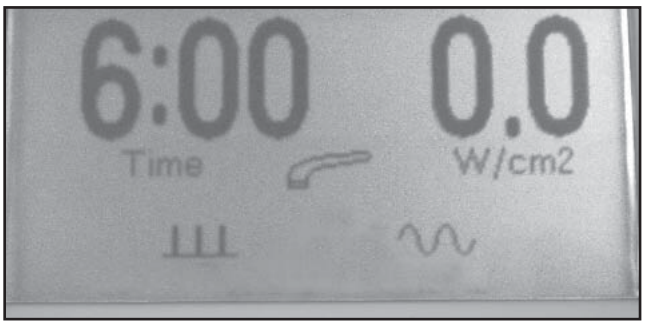


FIGURE 5.6

5.10 ULTRASOUND APPLICATOR OUTPUT TEST

Perform this test using all available Ultrasound Applicators used with the system being tested.

NOTE:
See **page 17** for a list of equipment required for Output Tests.

A. Ultrasound Applicator Output Test Procedures

1. Set up Ohmic Instruments UPM DT 10 or UPM DT 100 ultrasound power meter per operator's instructions and fill test reservoir with degassed water.
2. Place an Applicator into the power meter holder. Make certain the Applicator's Sound Head is completely submerged in the degassed water and centered directly over the stainless steel cone. **Refer to Figure 5.7.**
3. Zero or Tare the power meter.
4. Turn the unit on.
5. Press the Intensity Display button until "Watts" appears in the intensity area of the Display.
6. Increase Intensity to maximum.
7. Press "Start".
8. Press the Frequency button until "1 MHz" is displayed in the frequency area of Display.
9. Compare power meter readings to **Figure 5.8** for each of the power settings listed in the chart.
10. Press the Frequency button until "3.3 MHz" is displayed in the frequency area of Display. Repeat test and compare readings to **Figure 5.8**.

B. Ultrasound Applicator Output Test Results

1. Output ranges fall within the specified ranges as listed in **Figure 5.8.**

   Unit passed test.

2. Readings fall outside specified ranges of **Figure 5.8.**

   a) Possible bad degassed water in power meter.

   b) Possible use of power meter other than Ohmic Instruments UPM DT 10 or UPM DT 100 ultrasound power meter.

   c) Possible bad or out of calibration Applicator.

   d) Check Ultrasound Board.

   e) Check Control Board.

NOTE:
The position of the Applicator over the stainless steel cone is critical to the test results. The Applicator must be level and centered.

FIGURE 5.7

APPLICATOR OUTPUT SPECIFICATIONS		
APPLICATOR SIZE	POWER SETTING (WATTS)	OUTPUT RANGE
1 cm^2	1*	0.8 - 1.2
	2*	1.6 - 2.4
2 cm^2	1	0.8 - 1.2
	2	1.6 - 2.4
	4	3.2 - 4.8
5 cm^2	1	0.8 - 1.2
	2	1.6 - 2.4
	5	4.0 - 6.0
	10	8.0 - 12.0
10 cm^2	1	0.8 - 1.2
	5	4.0 - 6.0
	10	8.0 - 12.0
	15**	12.0 - 18.0
	20**	16.0 - 24.0

* 3.3 MHz Only
**1.0 MHz Only

FIGURE 5.8

5.10 ULTRASOUND APPLICATOR OUTPUT TEST (CONTINUED)

C. Timer Control/End of Treatment Test

NOTE:
Prior to testing, verify that Head Warming is off. Head Warming emitts ultrasound and the intensity will not reset to zero if Head Warming is on.

1. Turn on the unit.
2 Plug in an Applicator.
3. The Intensity Display button can read "Watts" or "Watts per cm^2" in the intensity area of the Display.
4. Increase Intensity to 0.1 MHz
5. Set the time to 1 minute.
6. Press "Start".
7. Verify that the green light on the Applicator goes out when the timer reaches zero and that the intensity resets to zero on the display.

5.11 ULTRASOUND DUTY CYCLE TEST

Perform this test using all Ultrasound Applicators used with the system being tested.

A. Ultrasound Duty Cycle Test Procedures

1. Set up Ohmic Instruments UPM DT 10 or UPM DT 100 ultrasound power meter per operator's instructions and fill test reservoir with degassed water.

⚠ WARNING

Use only degassed water in power meter for testing ultrasound applicators. Use of other types of water will cause false test results. See **page 12** for degassed water recipes.

Do not aerate water when filling power meter.

2. Place an Applicator into the power meter holder. Make certain the Applicator's Sound Head is submerged in the degassed water and centered directly over the stainless steel cone.
3. "Zero" or Tare the power meter.
4. Turn the unit on.
5. Press the Intensity Display button until "Watts" appears in the Intensity area of the Display.
6. Increase Intensity to maximum.
7. Press "Start".
8. Press the Duty Cycle button until "10%" is displayed in the duty cycle area of the Display.
9. Compare power meter readings to **Figure 5.9** for each of the following duty cycle settings listed in the chart.
10. Press the Frequency button until "3.3 MHz" is displayed in the frequency area of display. Repeat test and compare readings to **Figure 5.9**.

B. Ultrasound Duty Cycle Test Results

1. Duty Cycles fall within the specified ranges as listed in **Figure 5.9.**
   a) Unit passed test
2. Readings fall outside specified ranges of **Figure 5.9**.
   a) Possible bad degassed water in power meter.
   b) Applicator not level and centered over cone in power meter.
   c) Possible use of power meter other than Ohmic Instruments UPM DT 10 or UPM DT 100 ultrasound power meter.
   d) Possible bad or out of calibration Applicator.
   e) Check Ultrasound Board.
   f) Check Control Board.

DUTY CYCLE SPECIFICATIONS		
OUTPUT FOR 10%, 20% AND 50% DUTY CYCLES	**DUTY CYCLE**	**OUTPUT RANGE**
1 cm^2 at 2.7 Watts	10%	0.2 - 0.3
	20%	0.4 - 0.7
	50%	1.1 - 1.6
2 cm^2 at 5.4 Watts	10%	0.2 - 0.3
	20%	0.9 1.3
	50%	2.2 - 3.2
5 cm^2 at 12 Watts	10%	1.0 - 1.4
	20%	1.9 - 2.9
	50%	4.8 - 7.2
10 cm^2 at 20 Watts Operating at 1 MHz	10%	1.6 - 2.4
	20%	3.2 - 4.8
	50%	8.0 - 12.0
10 cm^2 at 10 Watts Operating at 3.3 MHz	10%	0.8 - 1.2
	20%	1.6 - 2.4
	50%	4.0 - 6.0

FIGURE 5.9

6.1 SEPARATING TOP FROM BOTTOM

⚠ WARNING

Unplug the unit from the power source and/or remove battery before attempting any removal or replacement procedures to prevent electrical shock.

A. Part Numbers

Intelect TranSport Top 27399
Vectra Genysis Top 27244
Base 27252

B. Tools & Equipment Required

- #1 Phillips Screwdriver

C. Separating Top from Bottom

1. Remove the Plynth from the bottom of the system. **Refer to Figure 6.1.**
2. Remove the Mains Power cord from the system. **Refer to Figure 6.1.**
3. Remove the rear Fan Grill from the system to gain access to the two rear mounting screws. **Refer to Figure 6.2.**
4. Remove the two front feet from the system to gain access to the two front screws. **Refer to Figure 6.3**.
5. Remove the four mounting screws from the bottom housing using the #1 Phillips screwdriver. **Refer to Figure 6.3**.
6. Carefully separate the upper and lower housings of the system.
7. Disconnect the Power Supply and Fan Harnesses from the Control Board of the system. **Refer to Figure 6.3**.
8. Reassemble the unit by reversing the steps above.

NOTE:

Do not overtighten the screws. Overtightening will damage the threads of the brass inserts.

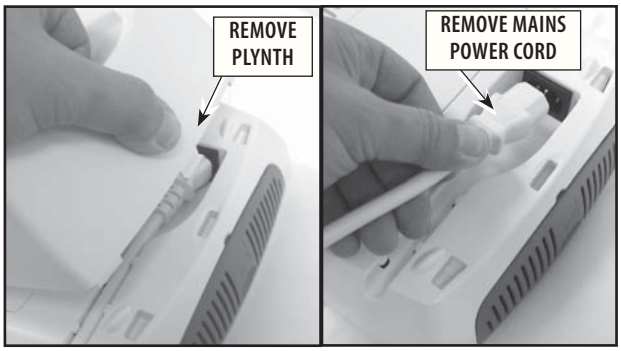


FIGURE 6.1

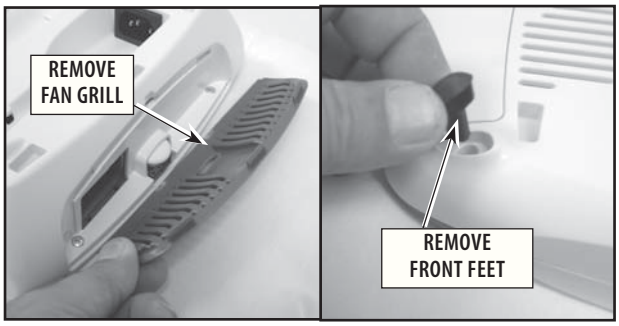


FIGURE 6.2

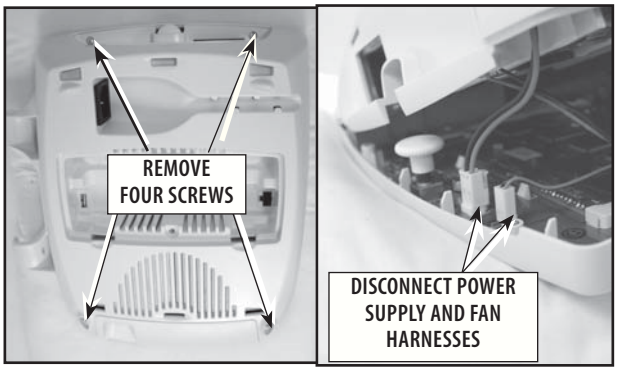


FIGURE 6.3

6.2 FAN

⚠ WARNING

Unplug the unit from the power source and/or remove battery before attempting any removal or replacement procedures to prevent electrical shock.

A. Part Numbers 27158

B. Tools & Equipment Required

- #1 Phillips Screwdriver

C. Fan

1. Separate top from bottom. **Refer to 6.1, part C.**
2. With #1 Phillips screwdriver, remove the 2 screws securing the Fan. **Refer to Figure 6.4.**
3. Remove Fan from the unit.
4. Remove Fan Baffle from Fan. **Refer to Figure 6.4.**
5. Install the replacement by reversing the steps above.

NOTE:

Refer to Figure 6.5 to route the Fan Harness when installing. Make certain that the Fan Baffle sits onto the system housing baffle tabs. **Refer to Figure 6.6.**

Make sure the Fan mounting screws are tightly secured. **Refer to Figure 6.7.**

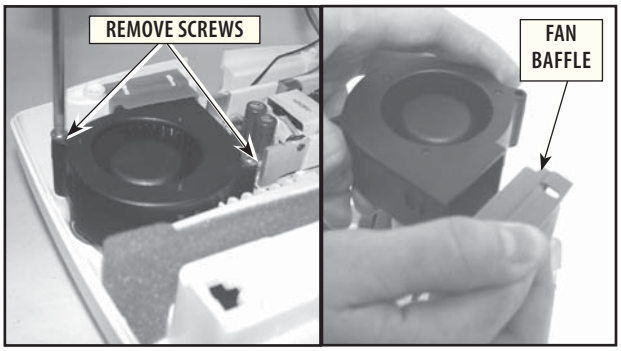


FIGURE 6.4

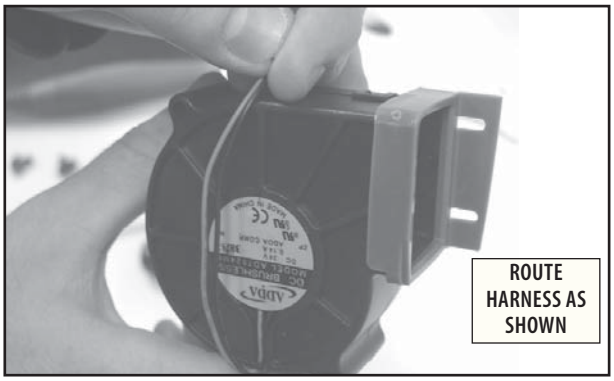


FIGURE 6.5

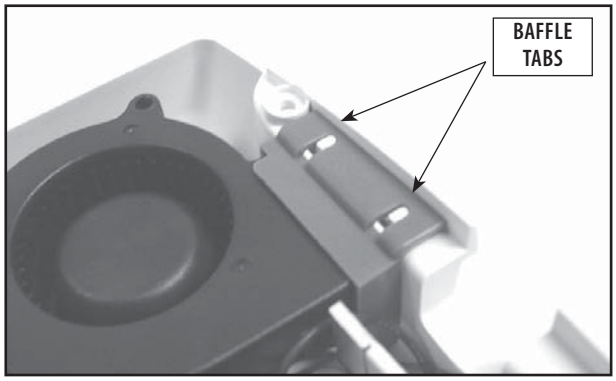


FIGURE 6.6

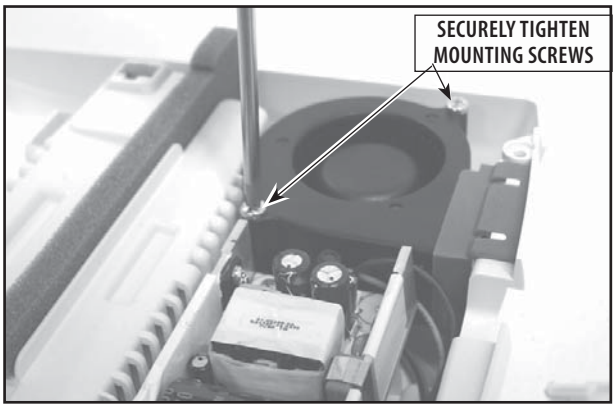


FIGURE 6.7

6.3 POWER SUPPLY

⚠ WARNING

Unplug the unit from the power source and/or remove battery before attempting any removal or replacement procedures to prevent electrical shock.

⚠ DANGER

The Power Supply will retain high voltage in the Power Supply Capacitor C4. discharge Capacitor using a multimeter prior to any service of the Power Supply

A. Part Numbers 27265

B. Tools & Equipment Required

- #1 Phillips Screwdriver
- Digital Multimeter
- 10k Resistor

C. Removing the Power Supply

1. Separate top from bottom. **Refer to 6.1, part C**.
2. Discharge the capacitor by wrapping a 10k resistor around the probes of a multimeter. Touch the leads of the mulitmeter to the prongs on the capacitor to discharge. **Figure 6.8 Insert.**
3. Watch the multimeter to verify that the voltage across the capacitor discharges close to zero volts DC.
4. With #1 Phillips screwdriver, remove the 2 screws securing the Power Supply. **Refer to Figure 6.9.**
5. Lift Power Supply and disconnect the Power Supply Harnesses from the Mains disconnect. When removing the Harnesses from the Mains disconnect, note the locations of the wire plug ins. **Refer to Figure 6.10.**

⚠ WARNING

Dielectric Withstand Test must always be preformed after a power supply has been replaced. Field technician unequipped to perform the Dielectric Withstand Test should contact the manufacturer for Power Supply replacement.

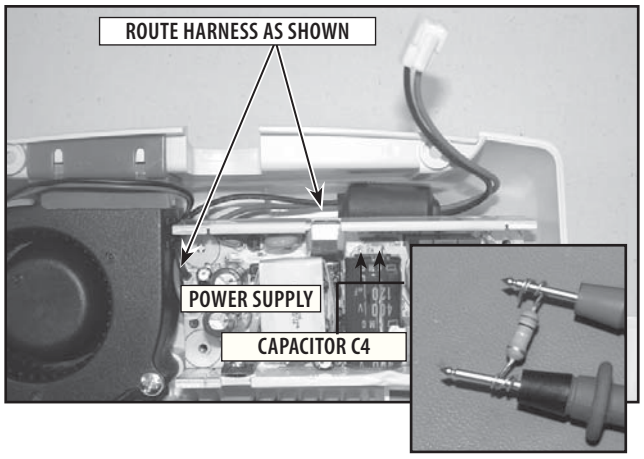


FIGURE 6.8

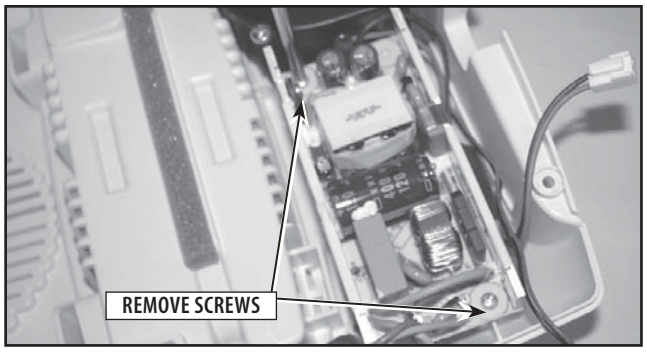


FIGURE 6.9

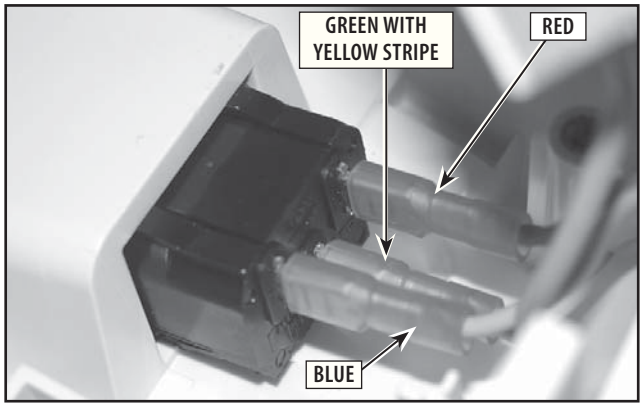


FIGURE 6.10

6.3 POWER SUPPLY (CONTINUED)

6. Remove Power Supply from system.
7. Carefully remove the copper tape securing the shield to the Power Supply. Remove from the inside of the Power Supply and retain the Shield for installation of the replacement.

   NOTE:
   The black side of the shield is non conductive and should always face the Power Supply.
8. Reverse **steps 4 - 7** to install the replacement. **Refer to Figure 6.8** to correctly route Power Supply Harness. Make certain the Power Supply sits onto alignment pins as shown in **Figure 6.11.**

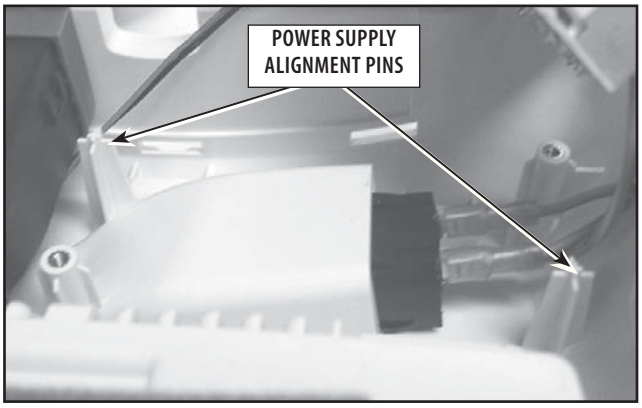


FIGURE 6.11

⚠ DANGER

Handle Power Supply Shield with caution. Penetration of the Shield may result in damage to the unit and/or personal injury.

6.4 ULTRASOUND BOARD

A. Part Number 27269

⚠ WARNING

Unplug the unit from the power source and/or remove battery before attempting any removal or replacement procedures to prevent electrical shock.

B. Tools and Equipment Required

- #1 Phillips Screwdriver

C. Ultrasound Board

1. Separate top from bottom. **Refer to 6.1, part C**.
2. With #1 Phillips screwdriver remove the 4 screws securing the Ultrasound Board to the unit. **Refer to Figure 6.12.**
3. Carefully remove Ultrasound Board from the Control Board/Ultrasound Board Header. **Refer to Figure 6.13.**
4. Remove Control Board/Ultrasound Board Header. Be careful not to bend or damage any of the pins. **Refer to Figure 6.13.**

   NOTE:

   The Ultrasound/Control board Header may stay attached to either the Ultrasound Board or the Control Board. It may be necessary to remove the Header for installation.
5. Install the Ultrasound Board by reversing the steps above.
6. Verify the ultrasound output with a known good Applicator. **Refer to Section 5.10.**

   NOTE:
   Install the Header with the long pins inserted into Ultrasound Board. Make certain Header is completely seated against Ultrasound Board. **Refer to Figure 6.14.**

   Refer to Figure 6.15 to align the Header with the Control Board. Carefully press the Header and board into place until the Header is completely seated into Control Board

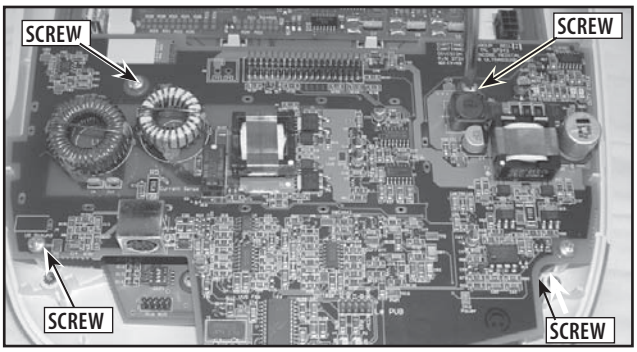


FIGURE 6.12

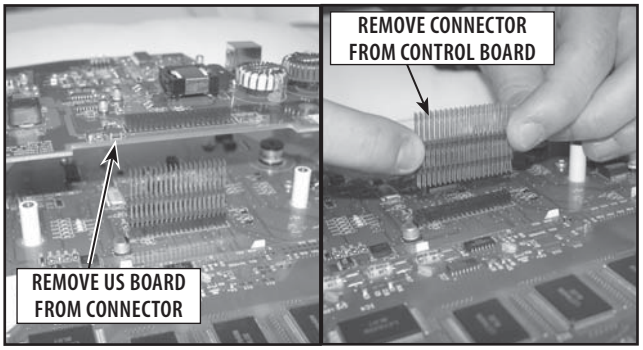


FIGURE 6.13

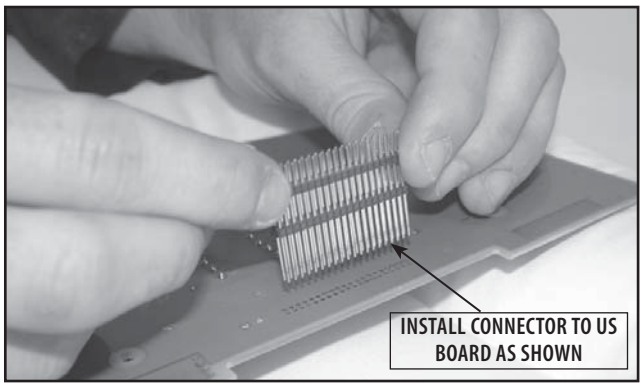


FIGURE 6.14

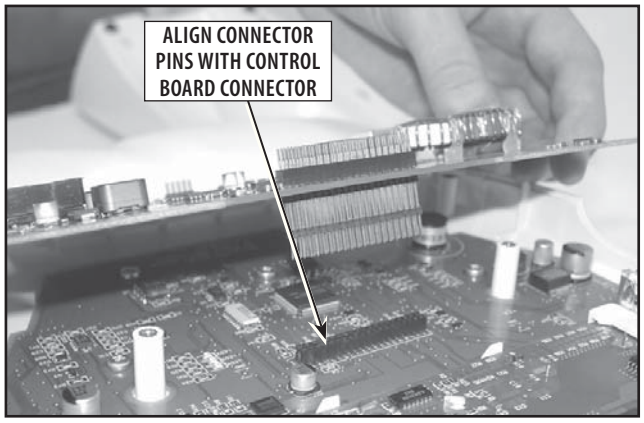


FIGURE 6.15

6.5 LCD DISPLAY

⚠ WARNING

Unplug the unit from the power source and/or remove battery before attempting any removal or replacement procedures to prevent electrical shock.

A. Part Number 27264

B. Tools and Equipment Required

- #1 Phillips Screwdriver
- Orange stick

C. Ultrasound Board

1. Separate top from bottom. **Refer to 6.1, part C.**
2. Remove Ultrasound Board. **Refer to 6.4, part C.**
3. Using a # 1 Phillips screwdriver remove the 4 LCD retaining screws. **Refer to Figure 6.16.**
4. With an orange stick or flat edged piece of plastic gently push in and up on each end of the LCD retaining brackets to free the locking tabs from the Control Board. **Refer to Figure 6.16.**
5. Set retaining brackets aside for reassembly.
6. Carefully remove the LCD from the Control Board being careful not to damage the LCD header pins. **Refer to Figure 6.17 .**
7. Install the LCD by reversing **steps 1 through 6**.

NOTE:

Make certain to align the LCD header pins with the top row on the Control Board LCD connector. **Refer to Figure 6.17.**

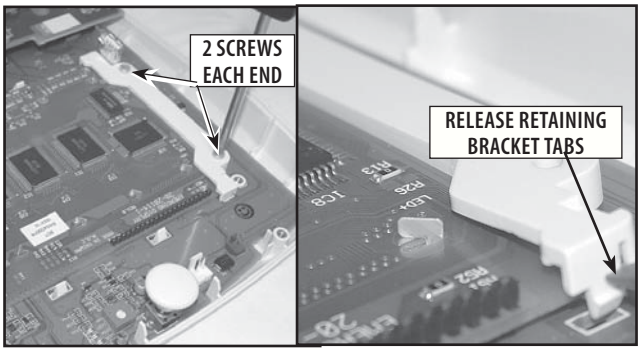


FIGURE 6.16

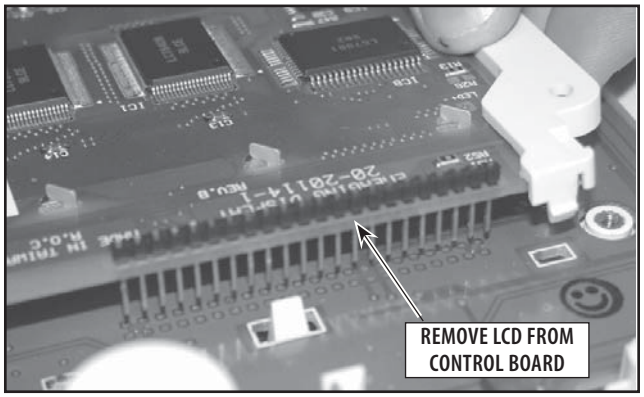


FIGURE 6.17

6.6 CONTROL BOARD

⚠ WARNING

Unplug the unit from the power source and/or remove battery before attempting any removal or replacement procedures to prevent electrical shock.

A. Part Number 27268

B. Tools and Equipment Required

- #1 Phillips Screwdriver
- Orange Stick

C. Control Board

1. Separate top from bottom. **Refer to 6.1, part C**.
2. Remove Ultrasound Board. **Refer to 6.4, part C.**
3. Remove LCD from Control Board. **Refer to 6.5, part C.**
4. Remove the 7 retaining screws securing the Control Board to the housing. **Refer to Figure 6.18.**
5. Using an orange stick or flat edged piece of plastic, carefully push locking tabs while lifting the Control Board to release Control Board from housing. **Refer to Figure 6.19.**
6. Remove the LCD Contrast Knob and retain for installation on the new Control Board. **Refer to Figure 6.20.**
7. Install the replacement Control Board by reversing **steps 1 - 6.**

NOTE:

Do not overtighten the screws. Overtightening will damage the threads of the brass inserts.

6.7 KEYMATS

A. Part Number 27368

B. Tools and Equipment Required

- #1 Phillips Screwdriver
- Flat Blade Screwdriver

C. Keymat

NOTE:

Follow **6.6 steps 1 through 5**, for Control Board removal. When the Control Board is removed lift the Keymats out and replace.

Keymats set includes the On/Off button.

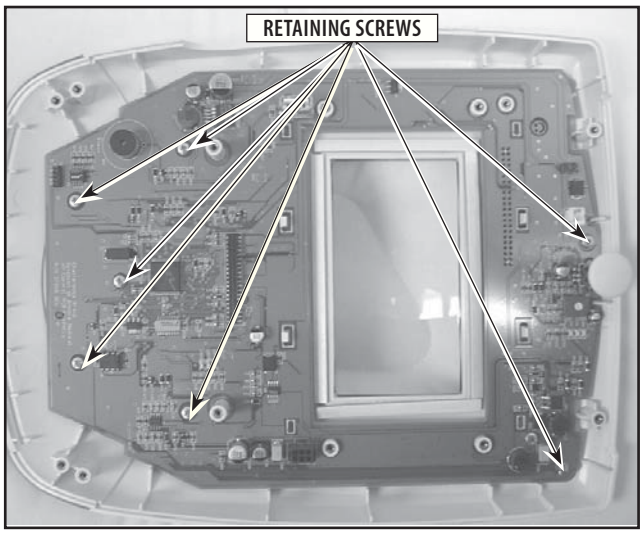


FIGURE 6.18

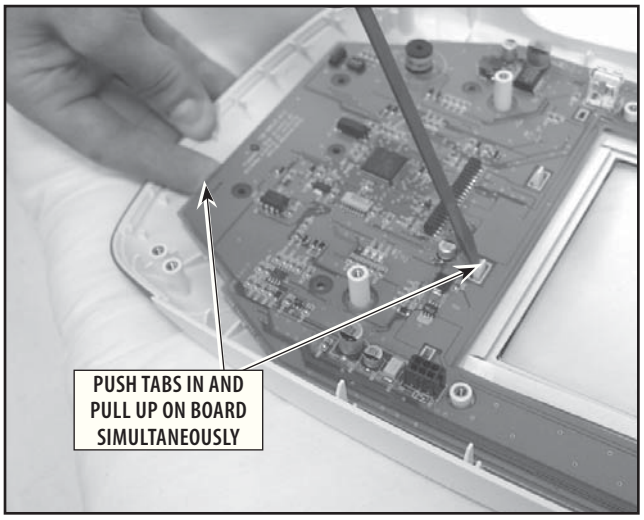


FIGURE 6.19

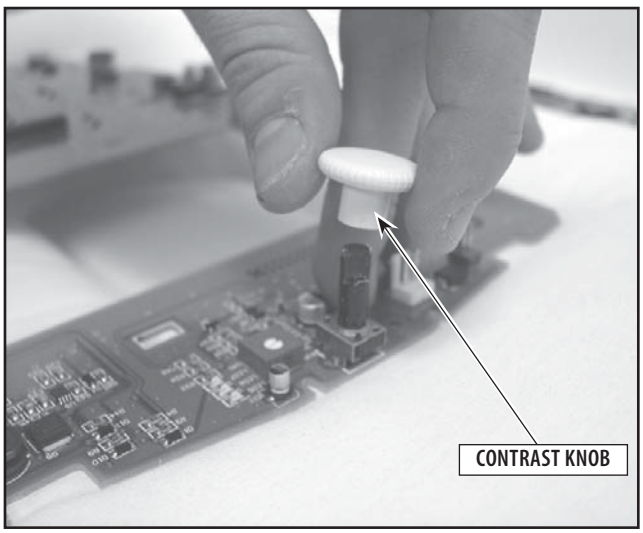


FIGURE 6.20

6.8 APPLICATOR SOUND HEAD

A. Part Numbers (Applicators)

Intelect Applicators

1 cm^2	27381
2 cm^2	27382
5 cm^2	27383
10 cm^2	27384

Genisys Applicators

1 cm^2	27333
2 cm^2	27334
5 cm^2	27335
10 cm^2	27336

Sound Heads

1 cm^2	27126
2 cm^2	27127
5 cm^2	27128
10 cm^2	27129

B. Tools and Equipment Required

- None

C. Sound Head Removal and Replacement

NOTE:
The Transducer is contained within the Sound Head of the Applicator.

1. Unscrew the Sound Head from the body of the Applicator. **Refer to Figure 6.21.**
2. After removing the Sound Head inspect the plastic Probe Spring Holder in the top of the Applicator Assembly for cracks or discoloration. **Refer to Figure 6.22.**

   NOTE:
   If the Probe Spring Holder is dark or contains crack it should be replaced. **Refer to Section 6.9, part C.**
3. Reverse steps 1 and 2 to install a replacement Sound Head.
4. Recalibrate the Applicator following the calibration procedure in **Section 7, part B.**

⚠ DANGER

Applicator must be calibrated after removal and replacement of any part, using an Ohmic UPM DT 10 or UPM DT 100.
Failure to calibrate a repaired Applicator, using the proper equipment, may result in serious injury to the patient.

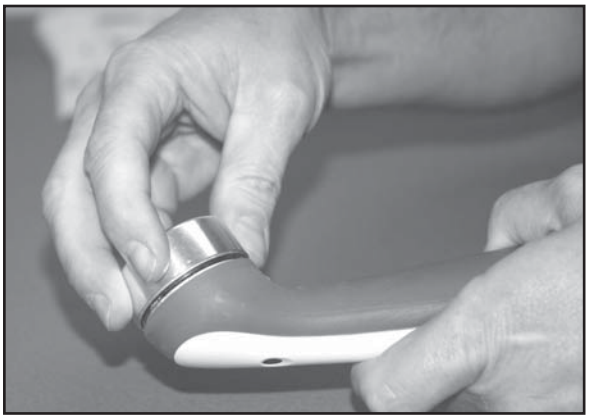


FIGURE 6.21

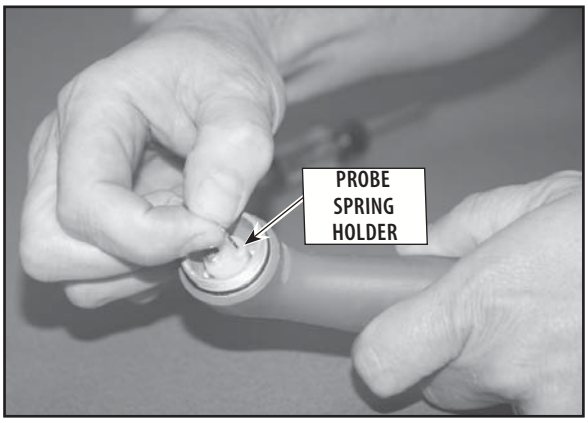


FIGURE 6.22

6.9 APPLICATOR PROBE SPRING HOLDER

A. Part Number 27040

B. Tools and Equipment Required

- #1 Phillips Screwdriver

C. Probe Spring Holder Removal and Replacement

1. Remove the Sound Head per **Section 6.8 part C.**
2. Remove the brass Probe Spring and inspect for damage. Retain the Probe Spring for installation if undamaged. **Refer to Figure 6.25.**
3. Using a # 1 Phillips screwdriver remove the screw securing the Probe Spring Holder to the Applicator housing. **Refer to Figure 6.25.**
4. Reverse **steps 1 through 3** for installation of the replacement spring.
5. Recalibrate the Applicator.

NOTE:
Do not over tighten the screw holding the Probe Spring Holder. A cracked or damaged Probe Spring Holder will affect the operation of the Applicator.

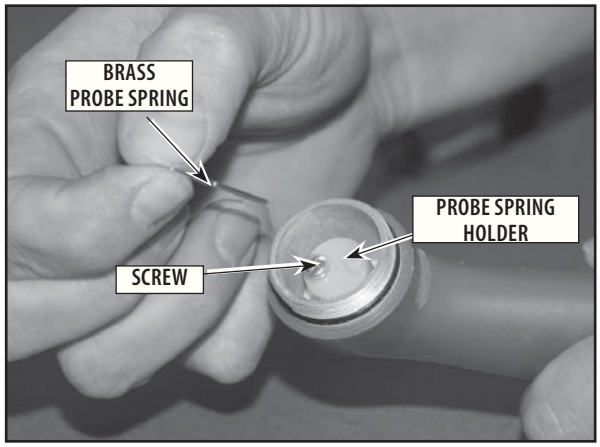


FIGURE 6.25

⚠ DANGER

Applicator must be calibrated after removal and replacement of any part, using an Ohmic UPM DT 10 or UPM DT 100.
Failure to calibrate a repaired Applicator, using the proper equipment, may result in serious injury to the patient.

6.10 APPLICATOR PC BOARD

A. Part Numbers

1 cm^2 27600
2 cm^2 27071
5 cm^2 27073
10 cm^2 27075

B. Tools and Equipment Required

- #1 Phillips Screwdriver

C. PC Board Removal and Replacement

1. Remove the Sound Head per **Section 6.8, part C.**
2. Remove the Probe Spring and Probe Spring Holder per **Section 6.9, part C**.
3. Remove the Applicator Cable per **Section 6.11, part C.**
4. Pull the PC Board from the Applicator housing. **Refer to Figure 6.24.**

   NOTE:
   If necessary needle nose pliers can be used to grasp the edge of the PC Board for removal.
6. Reverse steps 1 through 4 for installation of the replacement PC Board.
7. Recalibrate the Applicator.

   NOTE:
   When replacing the PC Board it should be oriented with the Cable Connector toward the inside of the Applicator Handle. Push the PC Board as far into the Applicator Handle as possible, with the Cable end fitting into the two PC Board slots. **Refer to Figure 6.25.** The Sound Head end of the PC Board fits against the screw standoff for the Probe Spring Holder. **Refer to Figure 6.26.**

⚠ DANGER

Applicator must be calibrated after removal and replacement of any part, using an Ohmic UPM DT 10 or UPM DT 100.
Failure to calibrate a repaired Applicator, using the proper equipment, may result in serious injury to the patient.

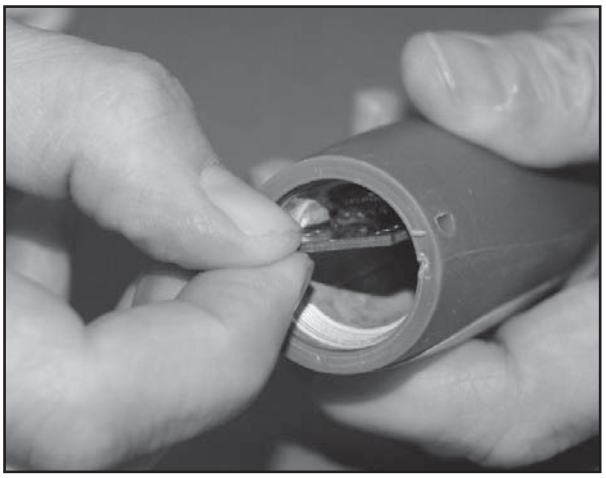


FIGURE 6.24

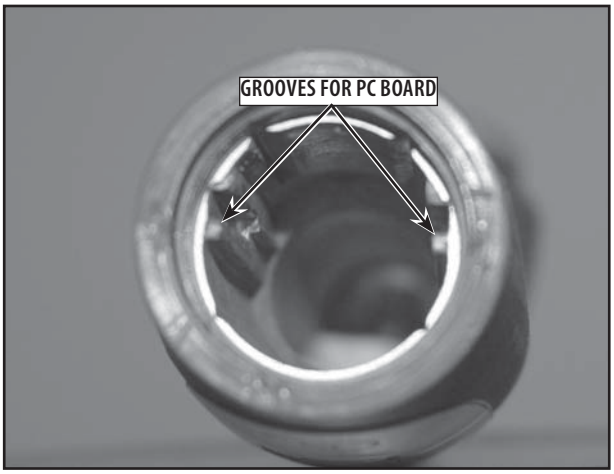


FIGURE 6.25

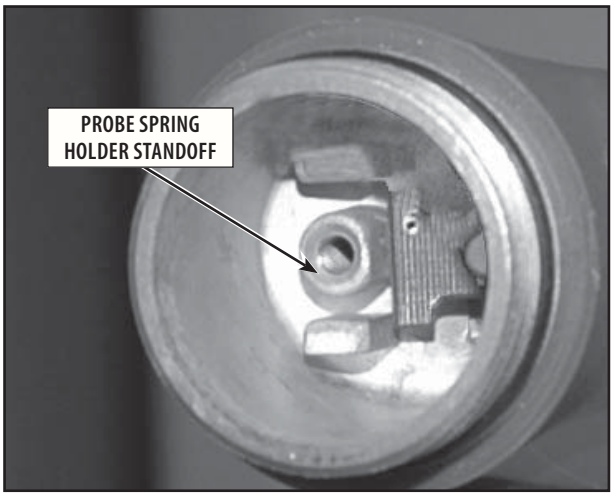


FIGURE 6.26

6.11 APPLICATOR CABLE

A. Part Numbers

Gray Applicator Cable..... 27351
Blue Applicator Cable..... 27106

B. Tools and Equipment Required

- #1 Phillips Screwdriver

C. PC Board Removal and Replacement

1. Using a counterclockwise motion, turn the end of the Applicator to remove the Applicator Cable. **Refer to Figure 6.29.**
2. Once the end of the cable is free from the Applicator housing, grasp the wires of the cable and gently pull the applicator connector from the holder on the PC Board.
3. To install position the two black tabs of the replacement Cable away from the inside of the Applicator. Using a small screwdriver push the Connector onto the pins of the Connector Holder. Gently push the sides of the Connector to verify that it is well seated.
4. Once the Cable Connector is well seated, hold the Cable and twist the wires 2 1/2 turns counterclockwise. **Refer to Figure 6.30.**

   NOTE:
   Twisting the Cable wires prior to screwing the Cable onto the Applicator housing will allow the wires to untwist and straighten out when the Cable is screwed into place.
5. Verify the operation of the Applicator.

FIGURE 6.29

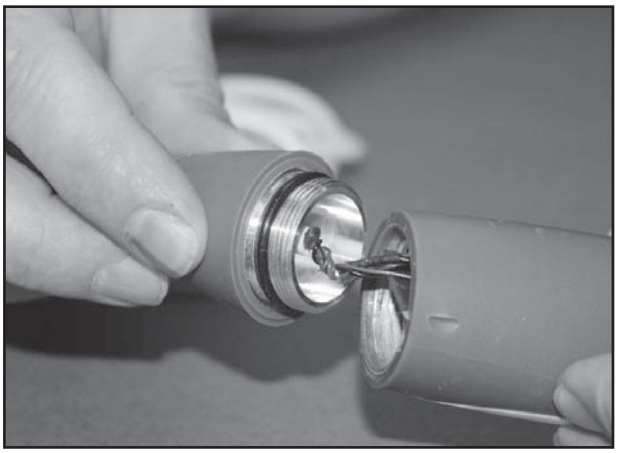


FIGURE 6.30

7.1 GENERAL PROCEDURES

A. Tools and Equipment Required

- All Ultrasound Applicators for the unit being serviced
- Ohmic Instruments UPM DT 10 or UPM DT 100 ultrasound power meter, set to "Watts"
- Degassed Water. **Refer to page 12** for degassed water recipes

⚠ WARNING

Use only degassed water in power meter for calibrating ultrasound applicators.

Use of other types of water will cause false readings and bad test results.

See page 12 for degassed water recipes.

Use of other brands or types of tools, equipment, fixtures, materials, and supplies other than those specifically listed on **page 12** will give bad test and calibration results.

If proper equipment is not available or cannot be obtained, send the ultrasound applicators to the factory for calibration.

B. Ultrasound Applicator Calibration Procedures

1. Perform the following on all Ultrasound Applicators annually or after repairing the Applicator.
2. With the system on, press the Clinical Libraries button once. **Refer to Figure 7.1.**
3. Simultaneously press and hold the Treatment Time and Intensity Decrease buttons for approximately 2 seconds. **Refer to Figure 7.2**. The calibration procedures screen should display.
4. Press the Frequency button once to highlight "Calibrate Applicator".
5. Press the Intensity Display button once to select.
6. Position the Ultrasound Applicator being calibrated into the Ohmic Instruments UPM UPM DT 10 or DT 100 power meter holder and set meter to "Watts". **Refer to Figure 7.3**.
7. Follow the instructions on the LCD Display.
8. When calibration is complete, repeat the process with the remaining Applicators. Follow the test procedures in **5.9 and 5.10** to verify that the Applicator is calibrated.

FIGURE 7.1

FIGURE 7.2

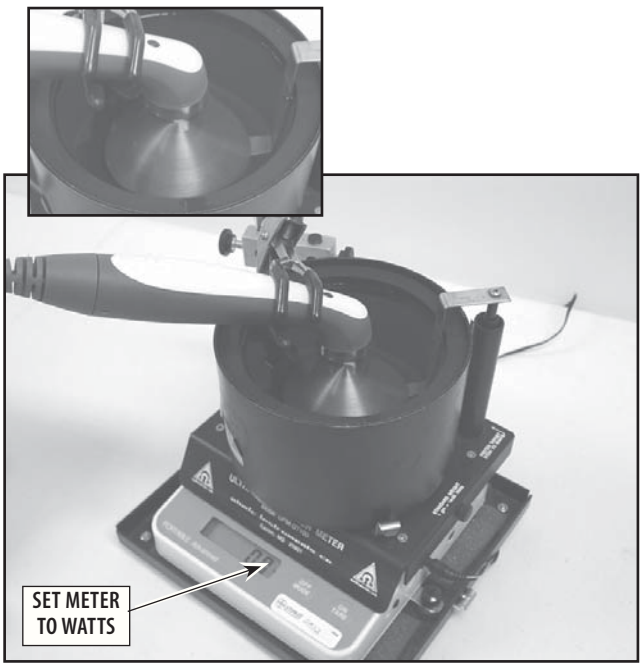
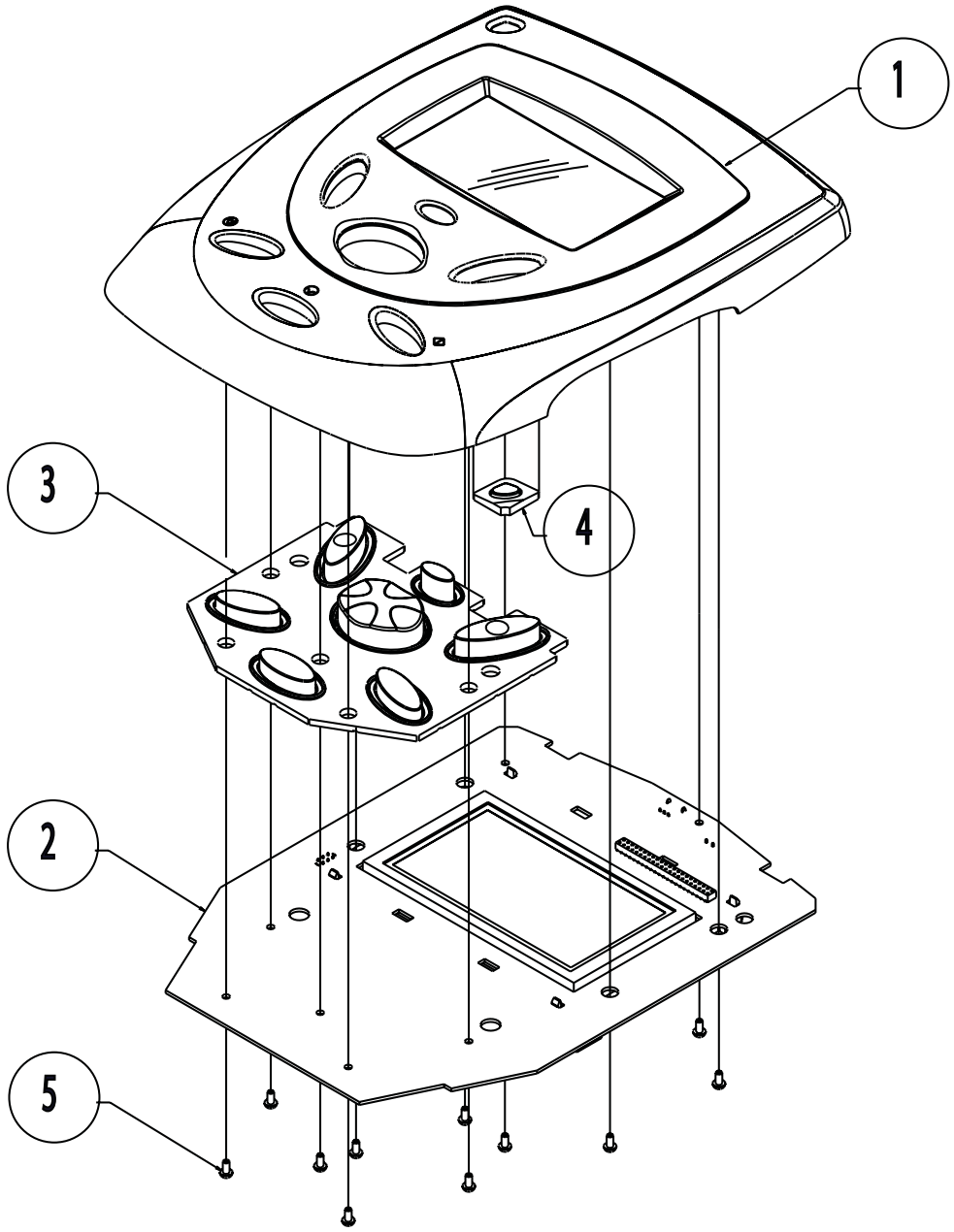


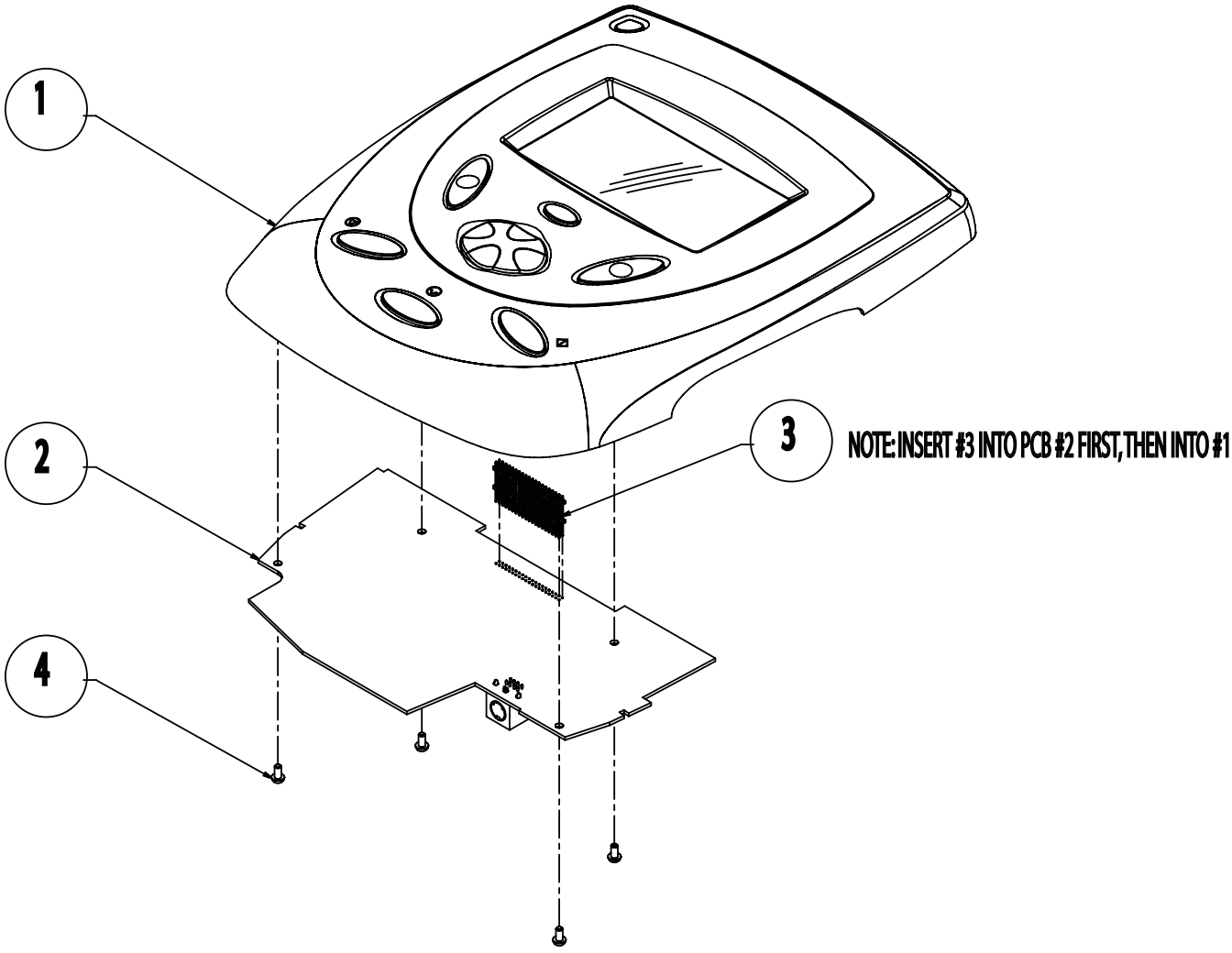
FIGURE 7.3

8.1 TOP ASSEMBLY



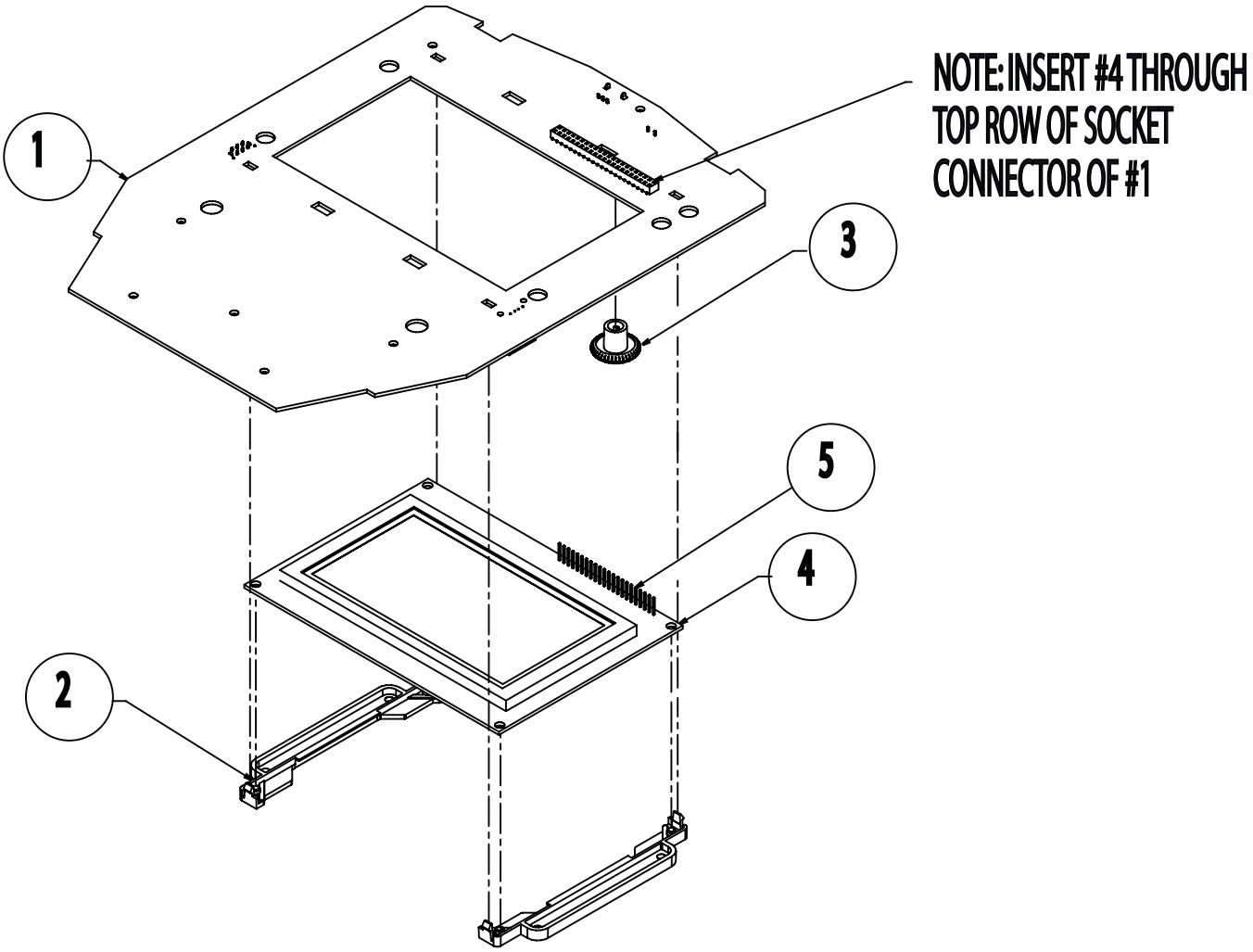
ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	27399 27244	TOP MOULDING ASSEMBLY (GREY) TOP MOULDING ASSEMBLY (BLUE)	1
2	SEE CONTROL BOARD ASSY DRAWING	CONTROL ASSEMBLY	1
3	27368 27255	KEYMAT (GREY) KEYMAT (BLUE)	1
4	N/A	PART OF KEYMAT	

8.2 ULTRASOUND ASSEMBLY



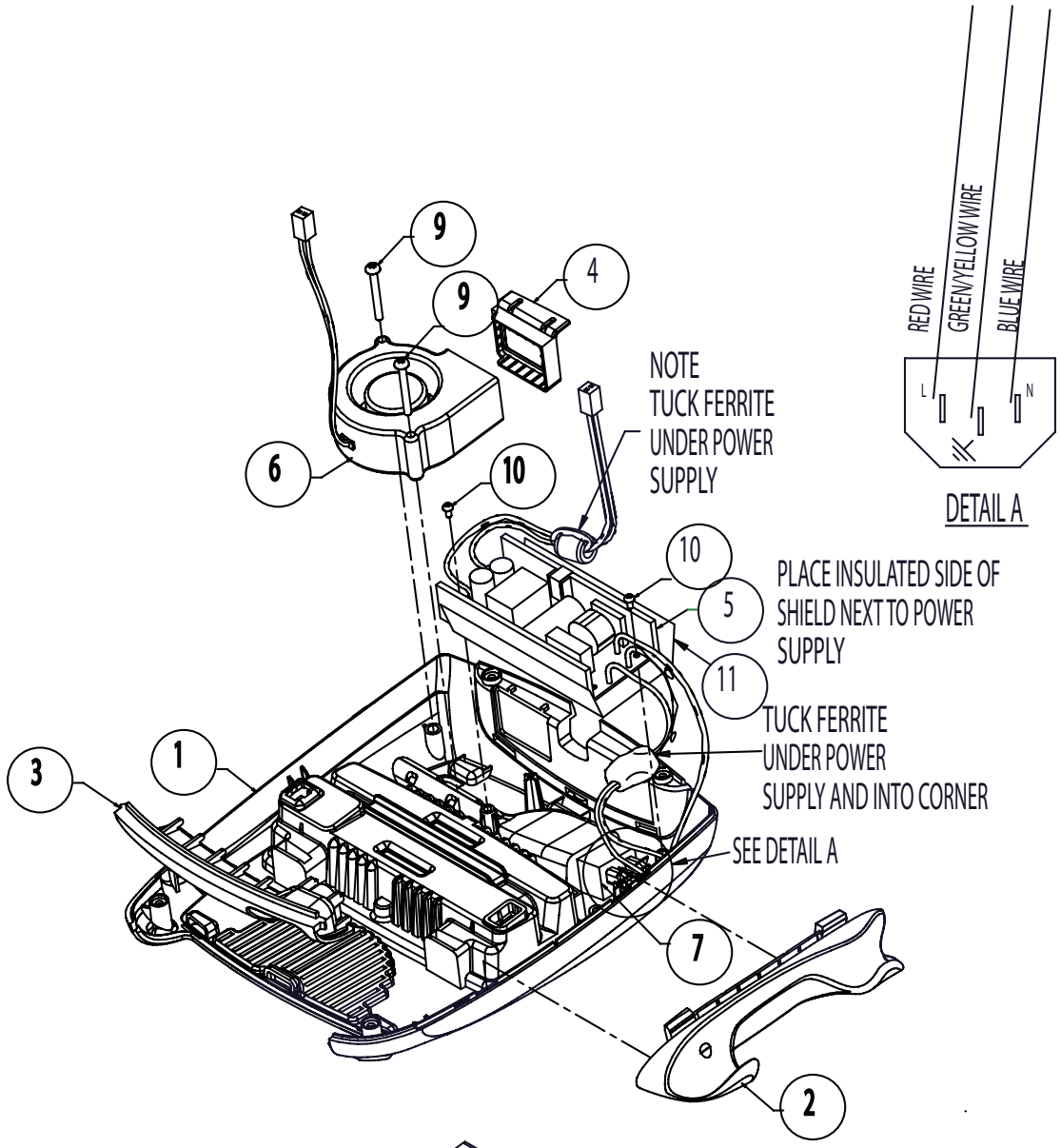
ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	SEE TOP ASSY DRAWING	TOP ASSEMBLY	1
2	27269	ULTRASOUND BOARD	1
3	27580	HEADER	1
4	27142	M3 X 6MM SCREWS PAN HEAD	4

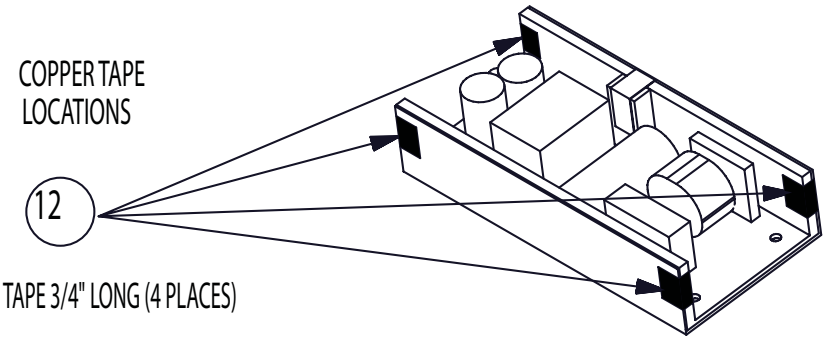
8.3 CONTROL BOARD ASSEMBLY



ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	27268	CONTROL BOARD	1
2	27261	LCD BRACKETS	2
3	27012	CONTRAST KNOB	1
4	27264	LCD	1
5	27588	HEADER	1

8.4 BASE ASSEMBLY





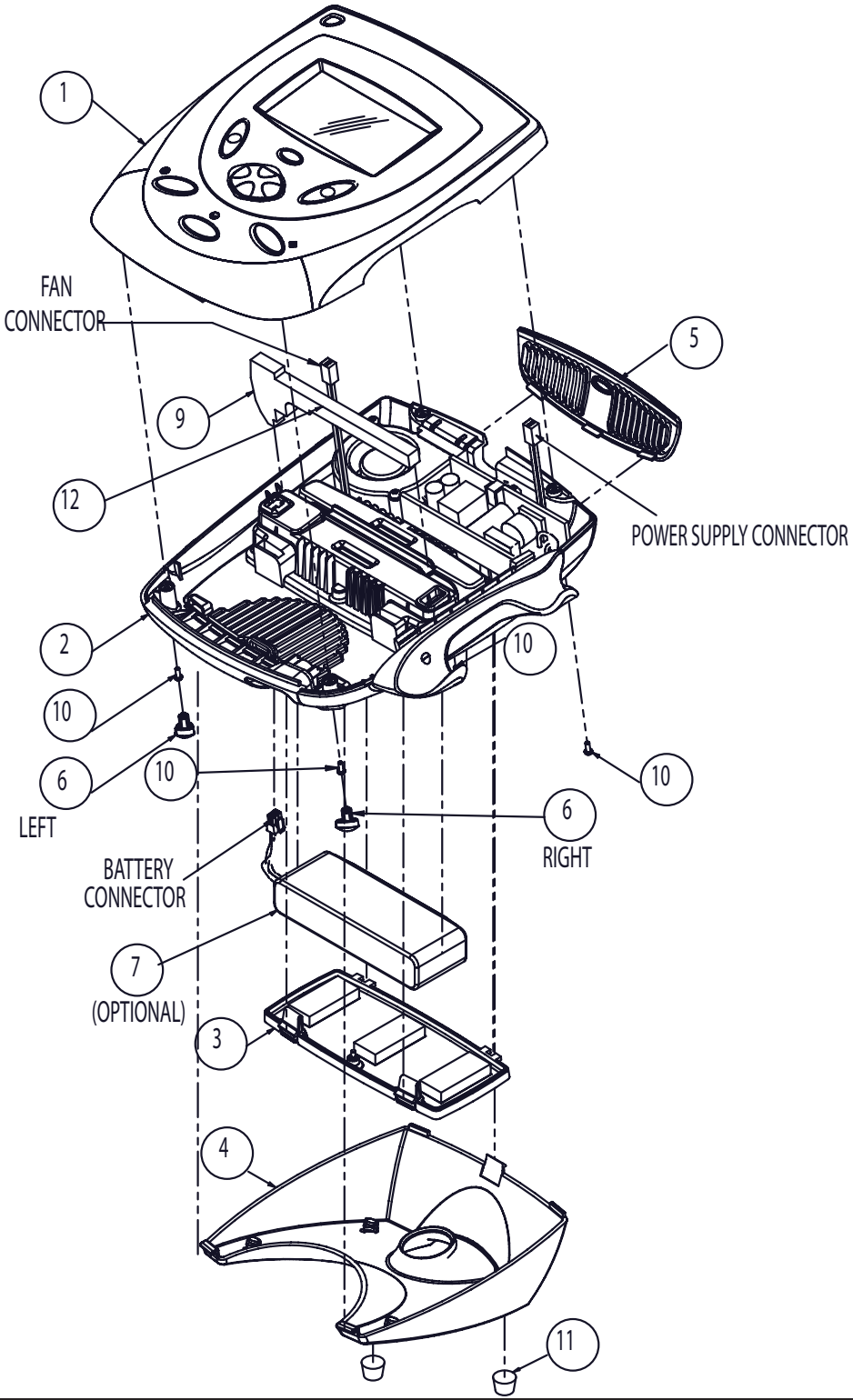
NOTE:
THE COPPER TAPE, PART 12, SECURES THE SHIELD, PART # 11, TO THE POWER SUPPLY HOUSING.

ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	27252	BASE	1
2	27256	APPLICATOR HOLDER	1

8.4 BASE ASSEMBLY (CONTINUED)

ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
3	27259	CONNECTOR INFILL PANEL	1
4	27367	FAN SEAL	1
5	27265	POWER SUPPLY	1
6	27158	FAN	1
7	27152	UNIVERSAL SNAP-IN INLET (IEC SOCKET)	1
9	27136	M4 X 35MM SCREW PAN HEAD	2
10	27142	M3 X 6MM SCREW PAN HEAD	2
11	27592	SHIELD T- PORT POWER SUPPLY	1
12	28152	COPPER TAPE 1/2"	0.25FT

8.5 FINAL ASSEMBLY

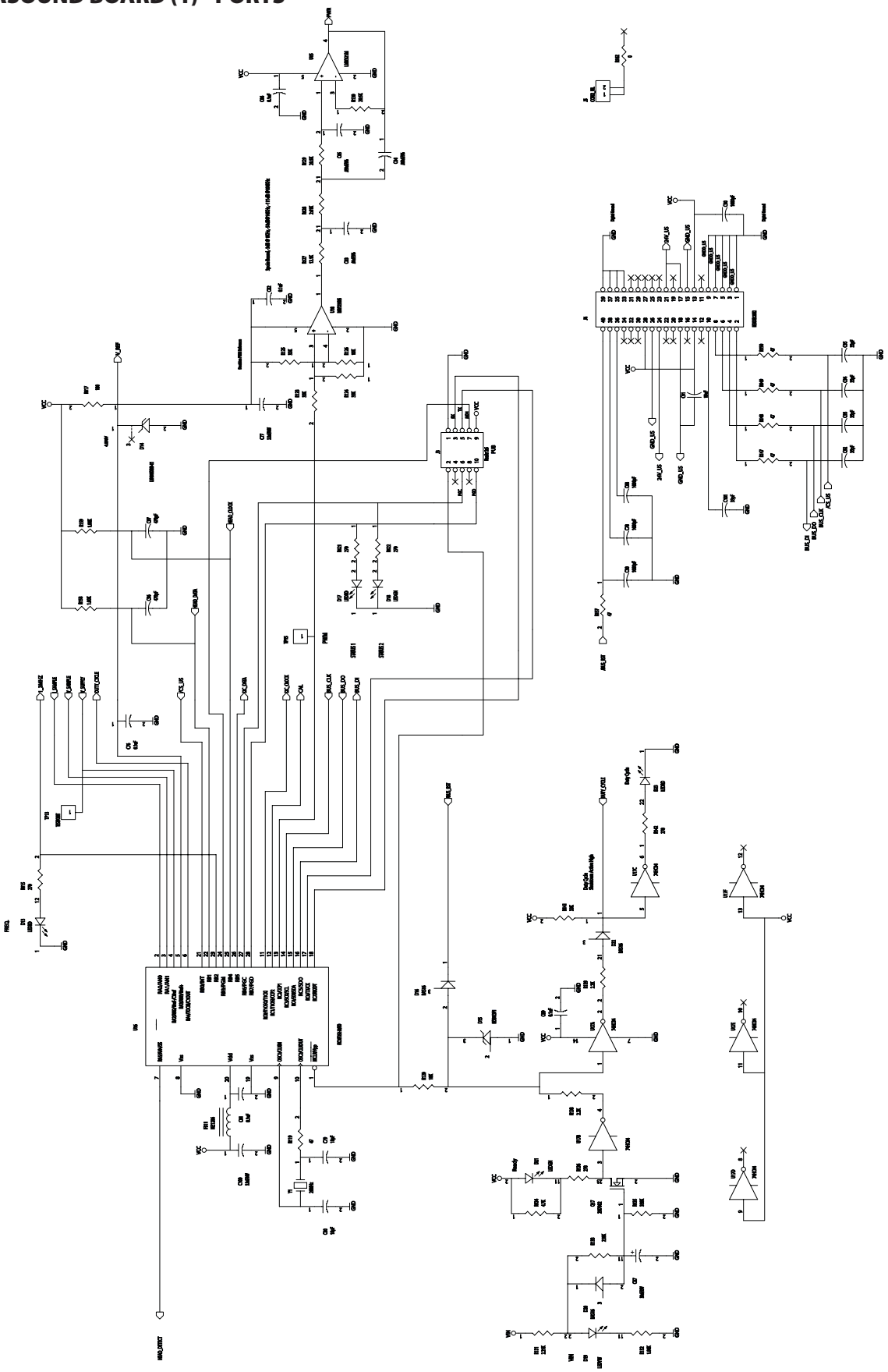


ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
1	SEE TOP ASSY DRAWING	TOP ASSEMBLY	1
2	SEE BASE ASSY DRAWING	BASE ASSEMBLY	1

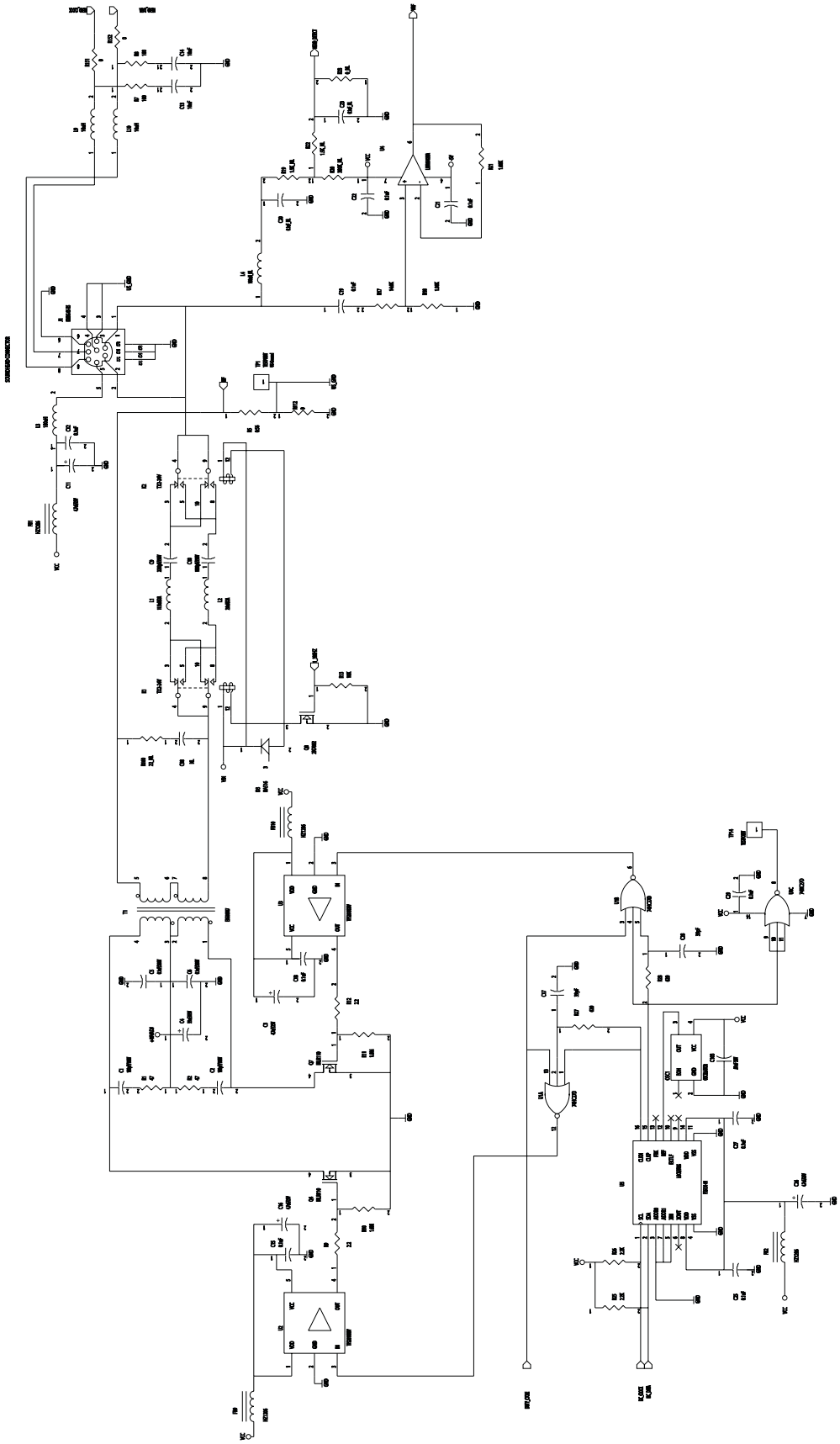
8.5 FINAL ASSEMBLY (CONTINUED)

ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY REQ'D
3	27410	BATTER COMPARTMENT COVER ASSEMBLY	1
4	27253	PLYNTH	1
5	27361 27263	REAR VENT (GREY) REAR VENT (BLUE)	1
6	27363 27365	FOOT LEFT FOOT RIGHT	1 1
7	27478	BATTERY PACK	1
9	27373	FOAM BAFFLE	1
10	27142	M3 X 6MM PAN HEAD SCREW	4
11	27150	FEET 1/2"D X 1/4" H BLK	2
12	27821	TAPE 3M	.17FT

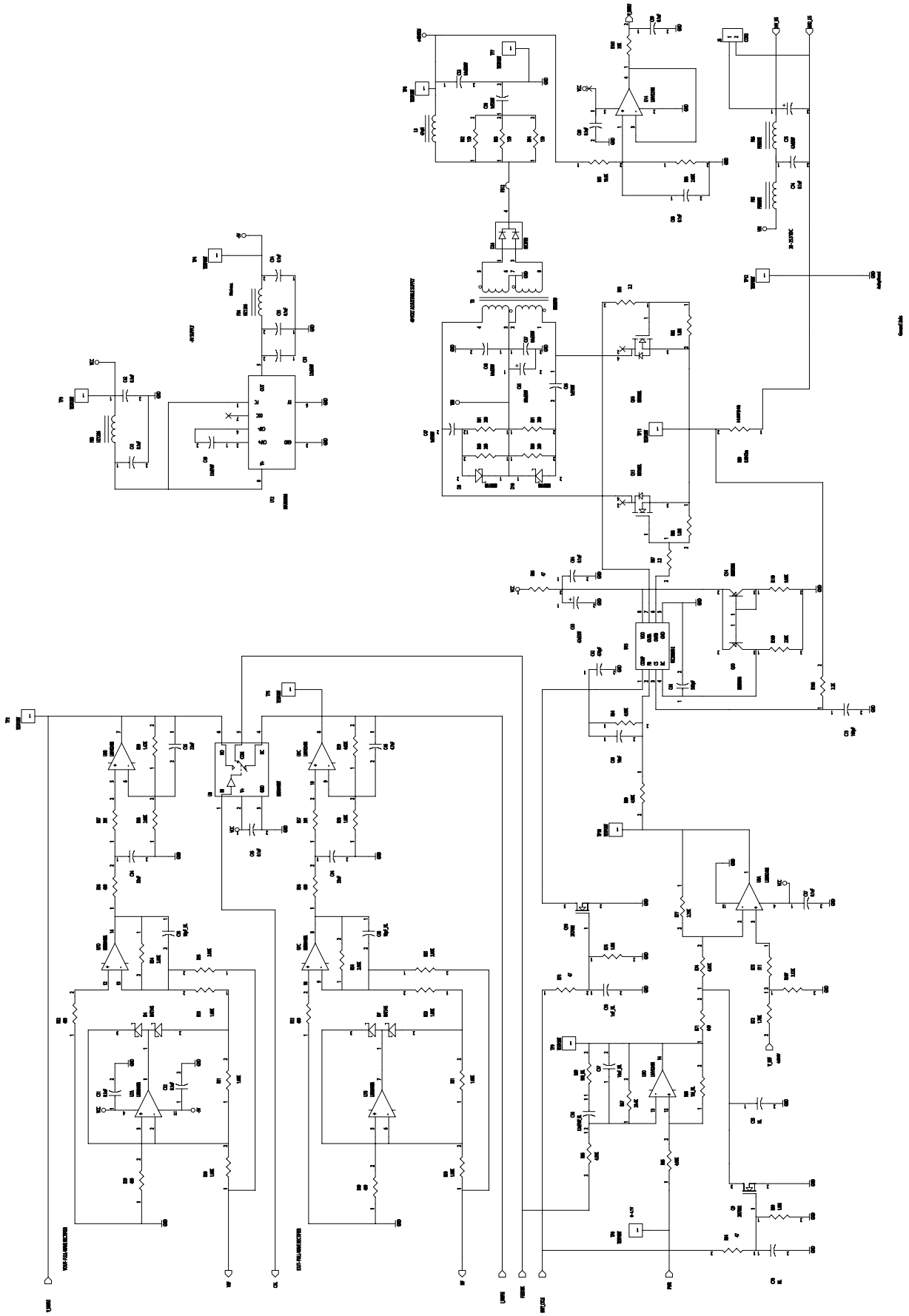
9.1 ULTRASOUND BOARD (1) - PORTS



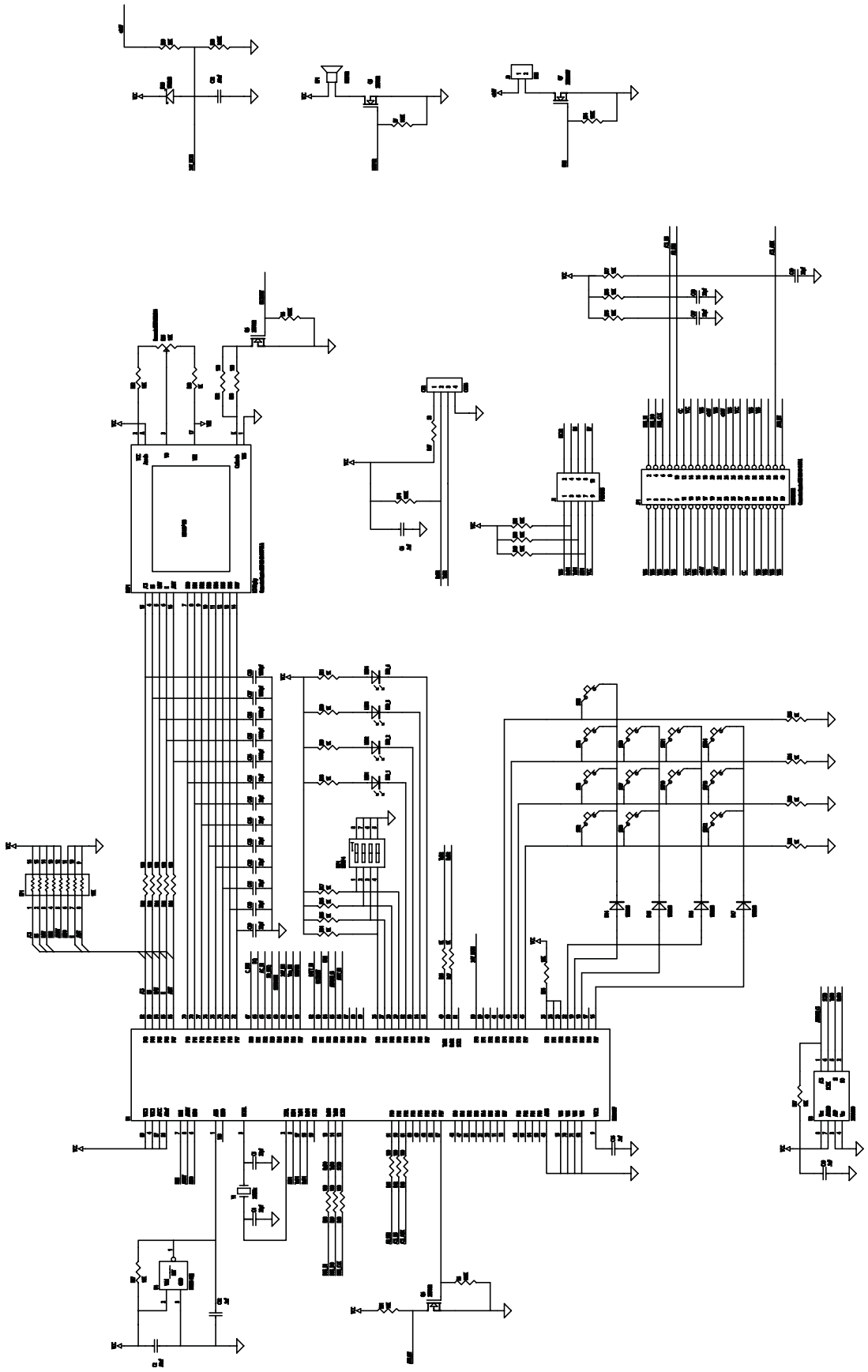
9.2 ULTRASOUND BOARD (2) - AMPS



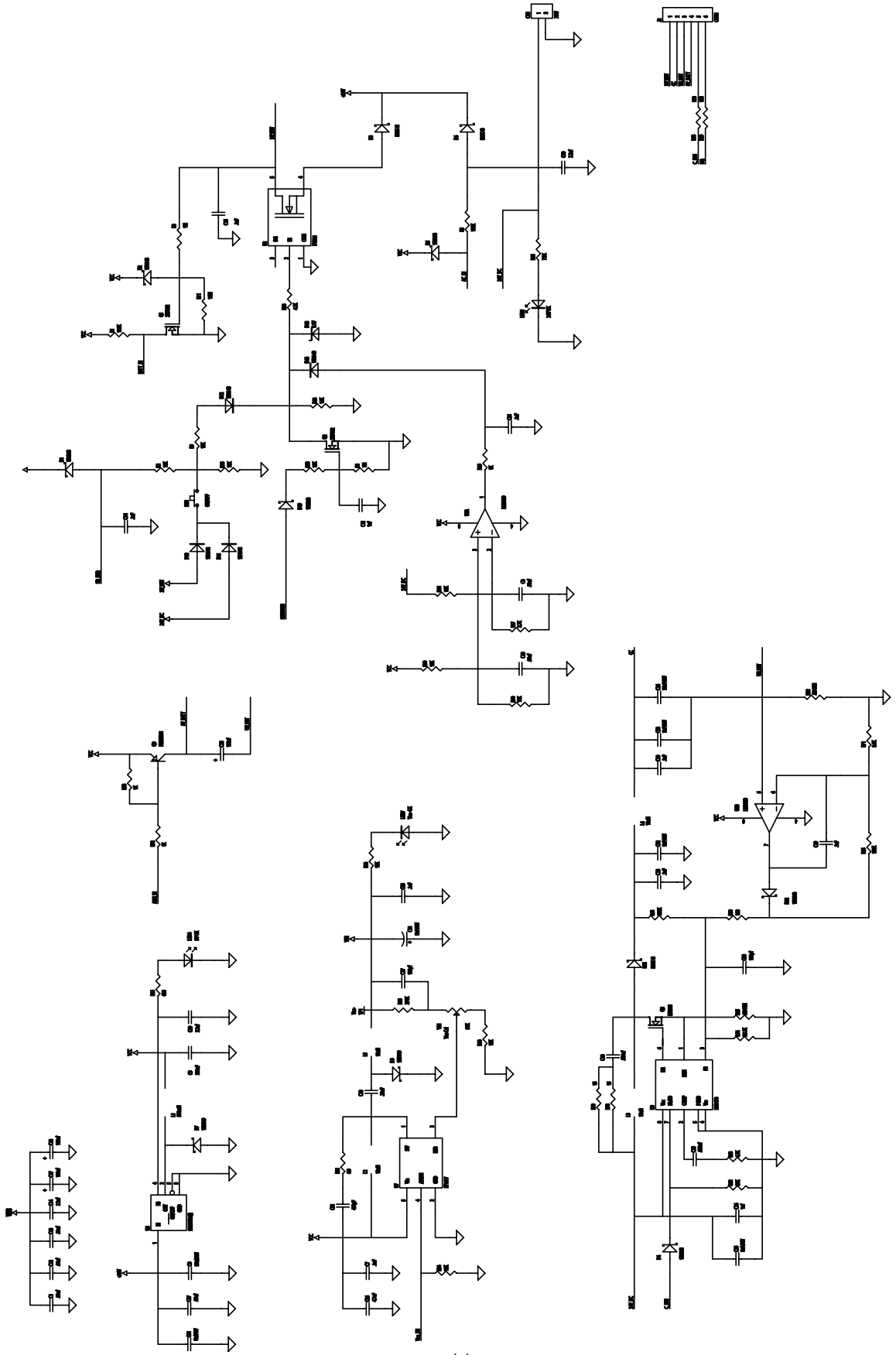
9.3 ULTRASOUND BOARD (3) - POWER SUPPLY



9.4 CONTROL BOARD (1)



9.5 CONTROL BOARD (2)



Chattanooga Group, a division of Encore Medical L. P., ("Company") warrants that the Intelect Transport/Vectra Genisys Ultrasound Therapy Systems ("Product") is free of defects in material and workmanship. This warranty shall remain in effect for two years (24 months) from the date of original consumer purchase. If these Products fail to function during the two years warranty period due to a defect in material or workmanship, at the Company's option, the Company or selling dealer will repair or replace this Product without charge within a period of thirty (30) days from the date on which the Product is returned to the Company or the dealer.

All repairs to the Product must be performed by a service center authorized by the Company. Any modifications or repairs performed by unauthorized centers or groups will void this warranty.

The warranty period for the applicators is one year (12 months).

This Warranty Does Not Cover:

- Replacement parts or labor furnished by anyone other than the Company, the selling dealer, or a certified Company service technician.
- Defects or damage caused by labor furnished by someone other than Company, the selling dealer or a certified Company service technician.
- Any malfunction or failure in the Product caused by product misuse, including, but not limited to, the failure to provide reasonable and required maintenance or any use that is inconsistent with the Product User's Manual.

COMPANY SHALL NOT BE LIABLE IN ANY EVENT FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Some locations do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

To obtain service from Company or the selling dealer under this warranty:

1. A written claim must be made within the warranty period to the Company or the selling dealer. Written claims made to the Company should be sent to:

   Chattanooga Group
   4717 Adams Road
   Hixson, TN 37343 USA
   1-800-592-7329
   1-423-870-2281
   1-423-875-5497 FAX
   chattgroup.com

   and

2. The Product must be returned to the Company or the selling dealer by the owner. A Return Authorization (RA) Number must be obtained before returning any product to the Company.

This warranty gives you specific legal rights and you may also have other rights which vary from location to location.

The Company does not authorize any person or representative to create for it any other obligation or liability in connection with the sale of the Product.

Any representative or agreement not contained in the warranty shall be void and of no effect.

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